Winter 2024

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## Education

| | |
|---|---|
| 1992 - Ph.D. | Columbia University<br>Human Cognition and Learning (Advisor: John B. Black) |
| 1988 - M.A. | Teachers College, Columbia University<br>Computers and Education |
| 1981 – Teaching Certificate | University of Southern California<br>California and Alaska Secondary Teaching Credential |
| 1979 - B.A. | Swarthmore College<br>Philosophy, Anthropology, English Literature |

## Selected Occupation

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|---|---|
| 2023… | Halper Family Faculty Director, Stanford Accelerator for Learning |
| 2015… | I. James Quillen Dean, Graduate School of Education, Stanford University |
| 2014… | Nomellini & Olivier Chair of Educational Technology |
| 2006… | Professor of Education, Stanford University |
| 2000 - 2006 | Associate Professor of Education, Stanford University |
| 1999 – 2000 | Associate Professor of Psychology and Human Development, Vanderbilt University |
| 1992 - 2000 | General Helper for the Cognition and Technology Group at Vanderbilt (CTGV),<br>Learning Technology Center, Vanderbilt University |
| 1992 - 1999 | Assistant Professor of Psychology and Human Development, Vanderbilt University |
| 1989 - 1992 | Research Fellow, Institute for Learning Technologies, Teachers College, Columbia |
| 1986 -1988 | Programmer, Instructor & Consultant in Lisp, C, Prolog, & Assembler |
| 1981 -1986 | Teacher of Mathematics, Science, Reading, and Language Arts,<br>Kaltag Jr. and Sr. High Schools, Kaltag, Alaska |
| 1979 - 1981 | Teacher of Remedial Reading and Writing at John Muir Jr. High,<br>Los Angeles, CA |
| 1975 | Teacher of Mathematics at Kitiwanga Day School, Kitiwanga, Kenya |

## Doctoral & Post-Doctoral Students

Dylan Arena [Vice President McGraw Hill] • Kristen Blair [Research Director, Stanford Accelerator for Learning] • Katie Cheng [Facebook] • Cathy Chase [Assist Prof: Teachers College, Columbia] • Min Chi (post-doc) [Assist. Prof: NC State University] • Luke Conlin (post-doc) [Assistant Prof. Salem State University] • Maria Cutumisu (post-doc) [Assoc. Prof: University of Alberta] • Nicole Hallinen [post-doc, Temple University] • Kevin Hartman [Research Scientist, NIE Singapore] • Julie Heiser (post-doc) [Research Scientist: Adobe] • Tanja Käser Jacober (post-doc) [Assist Prof: EPFL Switzerland] • Lee Martin [Prof: UC Davis] • Taylor Martin [Assoc Prof: Utah State] • Xavier Monroe [Congressional staffer] • Lindsay Oishi [Linked In] • Sandra Okita [Assoc Prof: Teachers College, Columbia] • Marily Oppezzo [Instructor, Stanford Medical Center] • Jay Pfaffman [Assist. Prof: UA Mobile] • Ana Saavedra • David Sears [Clinical Assoc. Prof: Purdue University] • Rob Semmens [Assist. Prof: Naval Academy] • Jessica Tsang [Klaus Jacobs Foundation] • Sashank Varma (post-doc) [Prof: Georgia Tech]

## Journal Articles

Schwartz, D. L. (2024). Achieving an Adaptive Learner. *Educational Psychologist*.

Hmelo-Silver, C., et al. (2023). The adventures of John Bransford: In memoriam. *Journal of the Learning Sciences.* DOI: 10.1080/10508406.2023.2219202

Oppezzo, M., Neale, M., Gross, J. J., Prochaska, J. J., Schwartz, D. L., Aikens, R. C., & Palaniappan. (2023). Moving outside the board room: A proof-of-concept study on the impact of walking while negotiating. PLOS ONE. https://doi.org/10.1371/journal.pone.0282681

Oppezzo, M., Wegner, L., Gross, J. J., Schwartz, D. L., Eckley, T., King, A. C., Mackey, S., & Stefanick, M. L. (2022). What moves you? Physical activity strategies in older women. *Journal of Health Psychology*. https://doi.org/10.1177/13591053211014593

Schwartz, D. L. (2021). Physically active learning. SCIENCE, October 1, Vol 374, Issue 6563, p. 26.

Cutumisu, M., & Schwartz, D. L. (2021). Feedback choices and their relations to learning are age-invariant starting in middle school: A secondary data analysis. *Computers & Education*, **171**.

Käser, T., & Schwartz, D. L. (2020). Modeling and analyzing inquiry strategies in open-ended learning environments. *International Journal of Artificial Intelligence in Education*, **30**, 504-535.

Cutumisu, M., Schwartz, D. L., & Lou, N. M. (2020). The relation between academic achievement and the spontaneous use of design-thinking strategies. *Computers & Education*, 149.

Cutumisu, M., Chin, D. B., Schwartz, D. L. (2019). A Digital Game-based Assessment of Middle-School and College Students' Choices to Seek Critical Feedback and to Revise. *British Journal of Educational Technology*, **50**(6), 2977-3003.

Chin, D. B., Blair, K., Wolf, R., Conlin, L., Cutumisu, M., & Schwartz, D. L. (2019). Educating and measuring choice: A test of the transfer of design thinking in problem solving and learning. *Journal of the Learning Sciences*, *28(3)*, 337-380.

Cutumisu, M, & Schwartz, D. L. (2018). The impact of critical feedback choice on students' revision, performance, and memory. *Computers in Human Behavior*, 78, 351-367.

Chin, D. B., Blair, K. P., & Schwartz, D. L. (2016). Got game? A choice-based learning assessment of data literacy and visualization skills. *Technology, Knowledge, and Learning,* 21(2)*,* 195-210*.*

Cutumisu, M., Blair, K. P, Chin, D. B. & Schwartz, D. L. (2016). Assessing whether students seek constructive criticism: The design of an automated feedback system for a graphic design task. *International Journal of Artificial Intelligence in Education, 27(2),* 419-447. doi:10.1007/s40593-016-0137-5.

Chin, D. B., Chi, M., & Schwartz D. L. (2016). A Comparison of two methods of active learning in physics: Inventing a general solution versus compare and contrast. *Instructional Science*, 44, 177-195.

Schwartz, D. L., Cheng, K. M., Salehi, S., & Wieman, C. (2016). Commentary: The half-empty question for socio-cognitive interventions. *Journal of Educational Psychology*, 108(3), 397- 404.

Mylopoulos, M., Brydges, R, Woods, N. N., Manzone, J., & Schwartz, D. L. (2016). Preparation for future learning: A missing competency in health professions education? *Medical Education 50(1), 115-123*.

Cutumisu, M., Blair, K. P., Chin, D. B., & Schwartz, D. L. (2015) Posterlet: A game-based assessment of children's choices to seek feedback and revise. *Journal of Learning Analytics*, 2, 49-71.

Tsang, J., Blair, K. P., Bofferding, L., & Schwartz, D. L. (2015). Learning to "see" less than nothing: Putting perceptual skills to work for learning numerical structure. *Cognition & Instruction*, 33, 154-197.

Shemwell, J., Chase, C., & Schwartz, D. L. (2015). Seeking the general explanation: A test of inductive activities for learning and transfer. *Journal of Research in Science Teaching, 52(1),* 58-83.

Oppezzo, M., & Schwartz, D. L. (2014). Give your ideas some legs: The positive effect of walking on creative thinking. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 40(4), 1142-1152

Martin, L., & Schwartz, D. L. (2014). A pragmatic perspective on visual representation and creative thinking. *Visual Studies*, 29, 80-93.

Arena, D. A., & Schwartz, D. L. (2013). Experience and explanation: Using videogames to prepare students for formal instruction in statistics. *Journal of Science Education and Technology*.

Chin, D. B., Dohmen, I. M., & Schwartz, D. L. (2013). Young children can learn scientific reasoning with Teachable Agents. *IEEE Transactions on Learning Technologies*, 6, 248-257.

Okita, S. A., & Schwartz, D. L. (2013). Learning by teaching human pupils and teachable agents: The importance of recursive feedback. *Journal of the Learning Sciences*, 22(3), 375-412.

Schwartz, D. L., Bransford, J. D., & Chase, C. C. (2012). Resisting overzealous transfer: Coordinating previously successful routines with needs for new learning. *Educational Psychologist,* 47(3)*,* 204-214.

Schwartz, D. L., Blair, K. P., & Tsang, J. M. (2012). How to build educational neuroscience: Two approaches with concrete instances. *British Journal of Educational Psychology Monograph Series II*, (8) 9-27.

Blair, K. P., Rosenberg-Lee, M., Tsang, J., Schwartz, D. L., & Menon, V. (2012). Beyond natural numbers: Representation of negative numbers in the parietal cortex. *Frontiers in Human Neuroscience*, 6(7).

Schwartz, D. L., Chase, C. C., Oppezzo, M. A., & Chin, D. B. (2011). Practicing versus inventing with contrasting cases: The effects of telling first on learning and transfer. *Journal of Educational Psychology*, 103(4), 759-775.

Varma, S. & Schwartz, D. L. (2011). The Mental Representation of Integers: An Abstract-to-Concrete Shift in the Understanding of Mathematical Concepts. *Cognition, 121, 363-385.*

Schwartz, D. & Tsang, J. (2011). Commentary 6: How Could Neuroscience Have Practical Applications for Engineering Education? In A. Johri & B. Olds, Situated Engineering Learning, *Journal of Engineering Education*, 100(1), 22-23.

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., & Klemmer, S. R. (2010). Parallel prototyping leads to better design results, more divergent creations, and self-efficacy gains. *ACM Transactions on Computer-Human Interaction*, 17(4).

Chin, D. B., Dohamen, I., Oppezzo, M., Cheng, B., Chase, C., & Schwartz, D. L. (2010). Preparation for future learning with Teachable Agents. *Educational Technology Research and Design, 58,* 649-669.

Berlin, D., Person, M., Mittal, A., Oppezzo, M., Chin, D., Starr, B., Klein, T., Schwartz, D., Altman, R. (2010). DNATwist: A web-based tool for teaching middle and high school students about pharmacogenomics. *Clinical Pharmacology and Therapeutics, **87**(4),* 393-395.

Chase, C., Chin, D. B., Oppezzo, M., & Schwartz, D. L. (2009). Teachable agents and the protégé effect: Increasing the effort towards learning. *Journal of Science Education and Technology, **18**,* 334-352.

Martin, L. & Schwartz, D. L. (2009). Prospective adaptation in the use of representational tools. *Cognition and Instruction*, **27**(4), 370-400.

Lindgren, R., & Schwartz, D. L. (2009). Spatial learning and computer simulations in science. *International Journal of Science Education*, **31**(3), 419-438.

Varma, S., McCandliss, B. D., & Schwartz, D. L. (2008). Scientific and pragmatic challenges for bridging education and neuroscience. *Educational Researcher*, **37**(3), 140-152.

Varma, S., & Schwartz, D. L. (2008). How should educational neuroscience conceptualize the relation between cognition and brain function? Mathematical reasoning as a network process. *Educational Research*, **50**, 149-161.

Himmelberger, K., & Schwartz, D. L. (2007). It's a homerun! Using mathematical discourse to support the learning of statistics. *Mathematics Teacher*, **101**(4), 250-256.

Blair, K., Schwartz, D. L., Biswas, G., & Leelawong, K. (2007). Pedagogical agents for learning by teaching: Teachable Agents. *Educational Technology,* **47**(*1),* 56-61.

Lin, X. D., Schwartz, D. L., Bransford, J. D. (2007). Intercultural adaptive expertise: Explicit and implicit lessons from Dr. Hatano. *Human Development*, **50**, 65-72.

Okita, Y. S., & Schwartz, D. L. (2006) Young Children's Understanding of Animacy and Entertainment Robots, *International Journal of Humanoid Robotics,* **3**, 393-412.

Schwartz, D. L. (2006). In memory of Giyoo Hatano. *Cognitive Studies: Bulletin of the Japanese Cognitive Science Society*, 13(2), 182-183.

Schwartz, D. L., & Martin, T. (2006). Distributed learning and mutual adaptation. *Pragmatics & Cognition*, **14**, 313-332.

- Reprinted in I. E. Dror & S. Harnad (Eds.), (2008) Cognition Distributed: How cognitive technology extends our minds (pp. 117-135). John Benjamins Press, Amsterdam.

Lin, X. D., Schwartz, D. L., & Hatano, G. (2005). Towards teacher's adaptive metacognition. *Educational Psychologist*, **40**, 245-256.

Martin, T., & Schwartz, D. L. (2005). Physically distributed learning: Adapting and reinterpreting physical environments in the development of the fraction concept. *Cognitive Science*, **29**, 587-625.

Biswas, G., Schwartz, D. L., Leelawong, K., Vye, N., & TAG-V (2005). Learning by teaching: A new agent paradigm for educational software. *Applied Artificial Intelligence,* **19,** 363-392.

Schwartz, D. L., Martin, T., & Pfaffman, J. (2005). How mathematics propels the development of physical knowledge. *Journal of Cognition and Development*, **6**, 65-88.

Schwartz, D. L., & Martin, T. (2004). Inventing to prepare for learning: The hidden efficiency of original student production in statistics instruction. *Cognition & Instruction,* **22,** 129-184.

Schwartz, D. L. & Lin, X. D. (2003) Technologies for learning from intercultural reflections. *Intercultural Education,* **14**, 291-306.

Lin, X. D. & Schwartz, D. L. (2003). Reflection at the crossroads of cultures. *Mind, Culture, & Activity,* **10**, 9-26.

- Reprinted and translated: Lin, X. D., & Schwartz, D. L. (2005). Reflection at the cultural intersection. *[Chinese Journal of] Educational Research*, **303(4)**, 38-47.

Schwartz, D. L., & Martin, T. (2003). Representations that depend on the environment: Interpretive, predictive, and praxis perspectives on learning. *Journal of the Learning Sciences*, **12**, 287-299.

Schwartz, D. L., & Martin, T. (2002). Embodied imagery and the urge to rules. *Journal of Mental Imagery, 26*, 75-78

Schwartz, D. L., & Lin, X. D. (2000). Computers, productive agency, and the effort after shared meaning. *Journal of Computing in Higher Education*, **12**, 3-33.

Schwartz, D. L. & Holton, D. (2000). Tool use and the effect of action on the imagination. *Journal of Experimental Psychology: Learning, Memory, & Cognition.***26***,* 1655-1665.

Bransford, J. D., Lin, X. D., & Schwartz, D. L. (2000). Technology, learning and schools: Comments on articles by Tom Carroll & Gerald Bracey. Contemporary Issues in Technology and Teacher Education, 1 (1). [http://www.citejournal.org/vol1/iss1/currentissues/general/article3.htm]

Schwartz, D. L., Brophy, S., Lin, X. D., & Bransford, J. D. (1999). Software for managing complex learning: An example from an educational psychology course. *Educational Technology Research and Development*, **47**, 39- 59.

Schwartz, D. L., & Black, T. (1999). Inferences through imagined actions: knowing by simulated doing. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **25**, 116-136.

Schwartz, D. L. (1999). Physical imagery: Kinematic versus dynamic models. *Cognitive Psychology*, **38**, 433-464.

Bransford, J. D., & Schwartz, D. L. (1999). Rethinking transfer: A simple proposal with multiple implications. In A. Iran-Nejad & P. D. Pearson (Eds.), *Review of Research in Education* , **24**, 61-101. Washington DC: American Educational Research Association.

Schwartz, D. L. & Moore, J. L. (1998). The role of mathematics in explaining the material world: Mental models for proportional reasoning. *Cognitive Science*, **22**, 471-516.

Schwartz, D. L. & Bransford, J. D. (1998). A time for telling. *Cognition & Instruction*, **16**, 475-522.

Barron, B. J., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., Bransford, J. D., & CTGV. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *Journal of the Learning Sciences,* **7**, 271-312.

Schwartz, D. L. & Goldman, S. R. (1996). Why people are not like marbles in an urn: An effect of context on statistical reasoning. *Applied Cognitive Psychology*, **10**, S99-S112.

Schwartz, D. L. & Black, J. B. (1996). Shuttling between depictive models and abstract rules: Induction and fallback. *Cognitive Science*, **20**, 457-497.

Schwartz, D. L. & Black, J. B. (1996). Analog imagery in mental model reasoning: Depictive models. *Cognitive Psychology,* **30**, 154-219.

Schwartz, D. L. (1995). Reasoning about the referent of a picture versus reasoning about the picture as the referent: An effect of visual realism. *Memory & Cognition*, **23**, 709-722.

Schwartz, D. L. (1995) The emergence of abstract representations in dyad problem solving. *Journal of the Learning Sciences*, **4**, 321-354.

Moore, J. L., Lin, X., Schwartz, D. L., Petrosino, A., Hickey, D. T., Campbell, J. O., Hmelo, C. & CTGV. (1994). The situated perspective: A reply to Tripp. *Educational Technology,* **34***,* 28-32.

- Reprinted in H. McLellan (Ed.), Perspectives on situated learning. Englewood Cliffs, NJ: Educational Technology Publishers.

Schwartz, D. L. (1993). The construction and analogical transfer of symbolic visualizations. *Journal of Research in Science Teaching*, **30**, 1309-1325.

Schwartz, D. L. (1988). Review of A. Bank & R. C. Williams (Eds.), Information Systems and School Improvement: Inventing the Future. *Teachers College Record*, **90**, 325.

Black, J. B., Swan, K. & Schwartz, D. L. (1988). Developing thinking skills with computers. *Teachers College Record*, **89**, 384-407.

- Reprinted in R. O. McClintock (Ed.), (1998) Computing and education: The second frontier. New York: Teachers College Press.

## Books and National Reports

Schwartz, D. L., Tsang, J. M., & Blair, K. P. (2016). The ABCs of How We Learn: 26 Scientifically Proven Approaches, How They Work, and When to Use Them. W. W. Norton. **NPR Best Books of 2016**

National Research Council (2018). How people learn II. [Committee member.]

Schwartz, D. L., & Arena, D. (2013). Measuring what matters most: Choice-based assessments for the digital age. Cambridge, MA: MIT Press.

PCAST (2012). Engage and excel. Producing one million additional college graduates with degrees in science, technology, engineering, and mathematics. Washington, DC: Office of Science and Technology Policy. [Working group member]

National Research Council (2011). Learning Science through Computer Games and Simulations. Committee on Science Learning: Computer Games, Simulations and Education, M. A. Honey and M. L. Hilton, Eds. Board on Science Education, Division of Behavioral and Social Sciences and Education, Washington DC. The National Academies Press. [Committee member]

## Chapters and Such

Wentworth, L., Khanna, R., Nayfack, M., & Schwartz, D. (2021). Viewpoint: Closing the Research-Practice Gap in Education. *Stanford Social Innovation Review*, Spring, 57-58.

Varma, S., Blair, K. P., & Schwartz, D. L. (2019). Cognitive science foundations of integer understanding and instruction. In A. Norton & M. Alibali (Eds.), *Constructing number: Merging perspectives from psychology and mathematics education* (pp. 307-327). NCTM/Springer

Schwartz, D. L., & Goldstone, R. (2015). Learning as coordination: Cognitive psychology and education. In L. Corno and E. Aldemann (Eds.), *Handbook of Educational Psychology* (pp. 61-75). American Psychological Association, Washington, DC.

Blair, K., & Schwartz, D. L. (2014, May 8). Neurothreats and how to prevent them [Letter to the editor: Comment on the paper A voyeuristic *view of possibilities and threats: Neurosciences and education*, by C. Lee]. *Human Development*, *57*(1), 4-7. Retrieved from http://www.karger.com/Journal/News/224249

Blair, K. P., Tsang, J. M., & Schwartz, D. L. (2013). The bundling hypothesis: How perception and culture give rise to abstract mathematical concepts in individuals. In S. Vosniadou (Ed.), *International Handbook of Research on Conceptual Change II* (pp. 322-340). New York: Taylor & Francis.

Martin, L., & Schwartz, D. L. (2013). Conceptual innovation and transfer. In S. Vosniadou (Ed.), *International Handbook of Research on Conceptual Change II* (pp. 447-465). New York: Taylor & Francis.

Oppezzo, M.A. & Schwartz, D.L. (2013). A behavior change perspective on self-regulated learning with teachable agents. In R. Azevedo, & V. Alevan (Eds), *International Handbook of Metacognition and Learning* (pp. 485-500). New York: Springer.

Blair, K. P., & Schwartz, D. L. (2012). A value of concrete learning materials in adolescence. In Reyna, V. F., Chapman, S., Dougherty, M., & Confrey, J. (Eds.). *The adolescent brain: Learning, reasoning, and decision making* (pp. 95-122). Washington, DC: American Psychological Association.

Dow, S. P., Fortuna, J., Schwartz, D., Altringer, B., Schwartz, D. L., & Klemmer, S. L. (2012). Prototyping dynamics: sharing multiple designs improves exploration, group rapport and results. In H. Plattner, C. Meinel & L. Leifer (Eds.) *Design Thinking Research Understanding Innovation*, (pp. 47-70). Berlin: Springer.

Schwartz, D. L., Chase, C., Wagster, J., Okita, S., Roscoe, R., Chin, D., & Biswas, G. (2009). Interactive metacognition: Monitoring and regulating a teachable agent. In D. J. Hacker, J. Dunlosky, and A. C. Graesser (Eds.), Handbook of Metacognition in Education (pp. 340-358). New York: Routledge, Taylor & Francis.

Schwartz, D. L., Lindgren, R., & Lewis, S. (2009). Constructivism in an age of non-constructivist assessments. In S. Tobias and T. Duffy (Eds.), Constructivist instruction: Success or failure (pp. 34-61). New York: Routledge, Taylor & Francis.

Bransford, J. D., & Schwartz, D. L. (2009). It takes expertise to make expertise: Some thoughts about why and how and Reflections on the Themes in Chapters 15-18. In K. A. Ericsson (Ed.), Development of professional expertise: Toward measurement of expert performance and design of optimal learning environments (pp. 432-448). Cambridge, UK: Cambridge University Press.

Schwartz, D. L. (2008). Bransford, John. D. In E. M. Andermann, L. Anderman, C. Chinn, T., Murdock, & H. L. Swanson (Eds.), Psychology of classroom learning: An encyclopedia. Cengage Learning.

Schwartz, D. L., Varma, S., & Martin, L. (2008). Dynamic transfer and innovation. in S. Vosniadou (Ed.), Internation Handbook of Research on Conceptual Change (pp. 479-506). New York: Taylor & Francis.

Schwartz, D. L., Chang, J., & Martin, L. (2008). Instrumentation and Innovation in Design Experiments: Taking the Turn to Efficiency. In A. E. Kelly, R. A. Lesh, and J. Y. Baek (Eds.), Handbook of Innovative Design Research in Science, Technology, Engineering, Mathematics (STEM) Education. NY: Routledge.

Schwartz, D. L., Blair, K. P., Biswas, G., Leelawong, K., & Davis, J. (2007). Animations of thought: Interactivity in the teachable agents paradigm. In R. Lowe & W. Schnotz (Eds). Learning with Animation: Research and Implications for Design (pp. 114-40). UK: Cambridge University Press.

Schwartz, D. L., Sears, D., Chang, J. (2007). Reconsidering prior knowledge. In M. Lovett and P. Shah (Eds.), Thinking with Data (pp. 319-344). Mahwah, NJ: Erlbaum.

Schwartz, D. L., & Hartman, K. (2007). It is not television anymore. Designing digital video for learning and assessment. In R. Goldman, R. D. Pea, B. Barron, & S. Derry (Eds.). Video research in the learning sciences (pp. 335-348). Mahwah, NJ: Erlbaum.

Bransford, J.D., Barron, B., Pea, R., Meltzoff, A., Kuhl, P. Bell, P., Stevens, R., Schwartz, D., Vye, N., Reeves, B., Roschelle, J. & Sabelli, N. (2006). Foundations and opportunities for an interdisciplinary science of learning. In K. Sawyer (Ed.), Handbook of the Learning Sciences (pp. 19-34). Cambridge University Press.

Schwartz, D. L., & Heiser, J. (2006). Spatial representations and imagery in learning. In K. Sawyer (Ed.), Handbook of the Learning Sciences (pp. 283-298). Cambridge University Press.

Bransford, J. D., Vye, N. J., Stevens, R., Kuhl, P., Schwartz, D. L., Bell, P., Meltzoff, A., Barron, B. J., Pea, R., Reeves, B., Roschelle, J., & Sabelli, N. (2006). Learning theories and education: Towards a decade of synergy. In P. A. Alexander and P. H. Winne (Eds.), Handbook of Educational Psychology (pp. 209-244). Mahwah, NJ: Erlbaum.

Schwartz, D. L., Bransford, J. D., Sears, D. L. (2005). Efficiency and innovation in transfer. In J. Mestre (Ed.), Transfer of learning from a modern multidisciplinary perspective (pp. 1 - 51). CT: Information Age Publishing.

Schwartz, D. L., Martin, T., & Nasir, N. (2005). Designs for knowledge evolution: Towards a prescriptive theory for integrating first- and second-hand knowledge. In P. Gardenfors & P. Johansson (Eds.), Cognition, Education, and Communication Technology (pp. 21-54). Mahwah, NJ: Erlbaum.

Schwartz, D. L., & Nasir, N. (2003). Transfer of learning. In W. Guthrie (Ed.) Encyclopedia of Education, 2nd Edition. (pp. 1449-1452). NY: Macmillan.

Biswas, G., Schwartz, D. L., Bransford, J. D., & The Teachable Agents Group at Vanderbilt. (2001). Technology support for complex problem solving: From SAD Environments to AI. In K. Forbus & P. Feltovich (Eds.), Smart machines in education (pp. 71-98). Menlo Park, CA: AAAI/MIT Press.

Schwartz, D. L., Biswas, G., Bransford, J. D., Bhuva, B., Balac, T., & Brophy, S. (2000). Computer Tools that Link Assessment and Instruction: Investigating What Makes Electricity Hard to Learn. In S. Lajoie (Ed.), Computers as cognitive tools. Volume II: No more walls (pp. 273-307). Mahwah, NJ: Erlbaum.

Bransford, J. D., Zech, L., Schwartz, D. L., Barron, B. J., Vye, N., & CTGV. (2000). Design environments that invite and sustain mathematical thinking. In P. Cobb (Ed.), Symbolizing and Communicating in Mathematics Classrooms (pp. 275-324). Mahwah, NJ: Erlbaum.

Schwartz, D. L., Lin, X., Brophy, S., & Bransford, J. D. (1999). Towards the development of flexibly adaptive instructional design. In C. M. Reigeluth (Ed.), Instructional-Design Theories and Models: A New Paradigm of Instructional Theory (Vol. 2, pp. 183-213). Mahwah, NJ: Erlbaum.

Schwartz, D. L. (1999). The productive agency that drives collaborative learning. In P. Dillenbourg (Ed.), Collaborative learning: Cognitive and computational approaches (pp. 197-218). NY: Elsevier Science.

Zech, L., Vye, N. J., Bransford, J. D., Goldman, S. R., Barron, B. J., Schwartz, D. L., Kisst-Hackett, R., Mayfield-Stewart, C. & CTGV. (1998). An introduction to geometry through anchored instruction. In R. Lehrer and D. Chazan (Eds.), New directions for teaching and learning in geometry (pp. 439-463). Mahwah, NJ: Erlbaum.

Vye, N. J., Schwartz, D. L., Bransford, J. D., Barron, B. J., Zech, L. and Cognition and Technology Group at Vanderbilt. (1998). SMART environments that support monitoring, reflection, and revision. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), Metacognition in Educational Theory and Practice (pp. 305-346). Mahwah, NJ: Erlbaum.

Schwartz, D. L., Goldman, S. R., Vye N. J., Barron, B. J., & CTGV. (1998). Aligning everyday and mathematical reasoning: The case of sampling assumptions. In S. Lajoie (Ed.) Reflections on Statistics: Agendas for learning, teaching and assessment in K-12 (pp. 233-274). Mahwah, NJ: Erlbaum.

Bransford, J. B., Zech, L., Schwartz, D. L., Barron, B. J., Vye, N., & CTGV (1996). Fostering mathematical thinking in middle school students: Lessons from research. In R. J. Sternberg & T. Ben-Zeev (Eds.), The nature of mathematical thinking. Hillsdale, NJ: Erlbaum.

Barron, B., Vye, N. J., Zech, L. Schwartz, D., Bransford, J. D., Goldman, S. R., Pellegrino, J.W., Morris, J. Garrison, S. & Kantor, R. (1995). Creating contexts for community based problem solving: The Jasper challenge series. In C. Hedley, P. Antonacci, & M. Rabinowitz (Eds.), Thinking and literacy: The mind at work . Hillsdale, NJ: Erlbaum.

## Computer Artifacts Designed or Programmed

Depictive Models: Object Oriented Mental Simulations (1996)

Hypothesis Visualization Software (HVS) [with Chuck Czarnik]
- Water Pollution Mystery HVS (1995)
- Lead Poisoning Mystery HVS (1996)

STAR.Legacy Multimedia Instructional Design Shell [with Sean Brophy]
- Border Blues Legacy (1996)
- Learning By Doing Legacy (1997)
- DC-Legacy (1998) [with Gautam Biswas]
- Simon Says Audiology Cases (1999) [with Anne-Marie Tharpe]
- Special Needs Students (2001) [with Arnetha Ball]
- Critical Case Instruction for Teachers [with Xiaodong Lin]

Interactive Analogies
- DC Circuits (1998) [with Sean Brophy]

I-WOV: Instruction With Optimal Variability [Aptima}

- Terrain Analysis [with Rob Semmens]

Teachable Agents [with Gautam Biswas]
- Betty's Brain (2000) [with Ying Bin, Krittaya Leelawong and Joan Davis]
- Billy's Delivery Service (1999) [with Thomas Katzleberger]
- Statistics Agent Orbo (2001) [with George Cheng]
- Moby the Scientist (2002) [with Anh Huynh]
- Milo the Modeler (2002) [with Kristen Pilner]
- J-Mole (2003) [with Kristen Pilner]

- Front of the Class Automated Concept Map Assessment (2004) [with Joan Davis]
- Triple A Challenge: An On-line Game (2004) [Joan Davis, Girija Mittagunta, Paula Wellings]
- Betty's Pumpkin Videogame (2005) [Kristen Blair, Ugochi Acholunu].
- Automated Assessments without Testing (2005) [Brian Lukoff]
- Betty's Brain Bank: Class management system (2007) [Henry Kwong]
-Teachable Agent Reward System (2010) [Ilsa Dohomen, Howard Palmer]

Critter Corral (2013) [available on iTunes, led by Kristen Blair]

Choice-based Assessments [Full AAALab contributing]

| | | |
|---|---|---|
| -Lightlet | -Photolet | -Farmlet |
| -Vetlet | -Tuglet | -Balancelet |
| -Idolet | -Vizlet | -Datalet |
| -Kitelet | -Posterlet | |

R2 [with Don O'Brien, Neil Levine, and Joe Premph] (2013)

Stats Invader! [with Dylan Arena] (2008)

Negative Number Clapper (2011) [led by Kristen Blair]

Physical Manipulatives [with Taylor Martin]
- The Annabox: Action Fractions (2002) [with Anna Veit]
- Folding Numbers (2011) [led by Jessica Tsang]

Web-based Dynamic Assessments
- Inductor: Resources for Learning AC Electricity (2000) [with Jay Pfaffman]
- Mathematizing Physical Systems (2000) [with Jay Pfaffman]
- Othila: Distributed expertise for self-guided learning (2003) [with Pavan]
- The Ideal Student for Negotiating Diversity in the Classroom (2005) [with XD Lin]

Virtual Field Trips
-Searsville Dam [with Ryan Petterson and Kristen Blair]

Virtual Homework Spaces (based in Active Worlds)
- Insect Habitats [with Jeff Holmes]

SuccessMaker Next Generation [with Pearson Digital, Kristen Blair, Sashank Varma, Janet Go]

## Educational Videotapes Authored or Co-authored

Outliers: Not Your Average Statistical Consultants
- Designing Cooperative Teams (1993)

Jasper Adventures [with CTGV]
- Working Smart (1993)
- Kim's Comet (1994)

Scientists in Action Series [with CTGV]
- Stones River Mystery (1994)
- The Lost Letters of Lazlo Clark (1995)
- Border Blues (1996)

## Published Proceedings

Kolchinski, Y. A., Ruan, S., Schwartz, D., & Brunskill, E. (2018). Adaptive natural-language targeting for student feedback. Proceedings of the Fifth Annual ACM Conference on Learning at Scale.

Cutumisu, M., Turgeon, K. L., González, L. M., Saiyera, T., Chuong, S., Schwartz, D. L. (2018). Eye tracking students' gazes on feedback in a digital assessment game. Poster. Proceedings of the 13th International Conference of the Learning Sciences *(ICLS)*. London, United Kingdom, June 23-27.

Kaeser, T., Hallinen, N. R, & Schwartz, D. L. (2017). Modeling exploration strategies to predict student performance within a learning environment and beyond. *LAK*, March 13-17, Vancouver, BC Canada.

Cutumisu, M. & Schwartz, D. L. (2016) Choosing versus receiving feedback: The impact of valence on learning from an assessment game. *Educational Data Mining.*

Cutumisu, M., & Schwartz, D. L. (2016). Exploring the Impact of Feedback Agency on the Enjoyment of Playing an Assessment Game. *44th Canadian Society for the Study of Education (CSSE) Conference*, May 28 - June 1, 2016, Calgary, Canada.

Cutumisu, M., & Schwartz, D. L. (2016). The effect of choosing versus receiving feedback on college students' performance. *International Association for Development of the Information Society*.

Cutumisu, M., & Schwartz, D. L. (2016). The impact of middle-school students' feedback choices and performance on their feedback memory. *International Association for Development of the Information Society*.

Blair, K. P., Pfaffman, J., Cutumisu, M., Hallinen, N., & Schwartz, D. L. (2015, April). Testing the effectiveness of iPad math game: Lessons learned from running a multi-classroom study. CHI '15 Extended Abstracts.

Cutumisu, M., & Schwartz, D. L. (2014, November). Choosing negative feedback improves learning for students of all ages: A game-based assessment of seeking negative feedback and revising. *Proceedings of the London International Conference in Education* (pp. 171-176). London, England.

Cutumisu, M., Chin, D. B., & Schwartz, D. L. (2104, October). A game-based assessment of students' choses to seek feedback and to revise. *Proceedings of the 11th International Conference on Cognition and Exploratory Learning in the Digital Age* (CELDA) (pp. 17-24). Porto, Portugal. ** Best Paper **

Chi, M., Schwartz, D. L., Blair, K. P., & Chin, D. L. (2014, July). Choice-based assessment: Can choices made in digital games predict 6th grade students' math scores? *Proceedings of the 7th International Conference on Educational Data Mining, (*36-43). London, England.

Conlin, L., Hallinen, N.R., & Schwartz, D.L. (2014, June). Supporting middle schoolers' use of inquiry strategies for discovering multivariate relations in interactive physics simulations. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.). *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS),* (pp. 31-37**).** Boulder, CO.

Hallinen, N.R., Cheng, J., Chi, M., & Schwartz, D.L. (2014, June). Tug of War – What is it good for? Measuring Student Inquiry Choices in an Online Science Game. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.). *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS) (1645-1646),* Boulder, CO.

Dow, S. P., Fortuna, J., Schwartz, D., Altringer, B, Schwartz, D. L., & Klemmer, S. (2011). Prototyping Dynamics: Sharing Multiple Designs Improves Exploration, Group Rapport, and Results, Conference on Human Factors in Computing Systems (CHI'11), Vancouver, BC, CAN, 2011.

Arena, D., & Schwartz, D.L. (2010). Stats Invaders! Learning about statistics by playing a classic video game. Proceedings of the Fifth International Conference on Foundations of Digital Games. ACM.

Chase, C.C., Shemwell, J.T., & Schwartz, D.L. (2010). Explaining across contrasting cases for deep understanding in science: An example using interactive simulations. Proceedings of the International Conference of the Learning Sciences.

Pareto, L., Schwartz, D. L.. & Svensson, L. (2010). Learning by Guiding a Teachable Agent to Play an Educational Game. In S. D. Craig & D. Dicheva (Eds.), Proceedings of the 14th Annual International Conference on Artificial Intelligence in Education, (pp. 662-664). IOS Press.

Tsang, J.M., & Schwartz, D.L. (2009). Symmetry in the semantic representation of integers. In N. Taatgen, & H. van Rijn (Eds.), Proceedings of the 31st Annual Conference of the Cognitive Science Society (pp. 323-328). Austin, TX: Cognitive Science Society.

Hogyeong, J., Gupta, A., Roscoe, R., Wagster, J. Biswas, G., & Schwartz, D. (2008). Using hidden Markov models to characterize student behaviors in learning-by-teaching environments. Lecture Notes in Computer Science: Intelligent Tutoring Systems (p. 614-625). Berlin, Springer.

Schwartz, D. L., & Martin, L. (2007). Instruction and assessment for future learning. In Chinn, C., Erkens, G., & Puntambekar, S. (Eds.), Proceedings of the Computer Supported Collaborative Learning Conference, New Brunswick, New Jersey (pp. 30-32).

Martin, L., & Schwartz, D. L. (2007). "Catalysts to creating representational tools and the benefits for learning." In Chinn, C., Erkens, G., & Puntambekar, S. (Eds.), Proceedings of the Computer Supported Collaborative Learning Conference, New Brunswick, New Jersey (pp. 496-498).

Varma, S., Schwartz, D. L., Lindgren, R., & Go, J. (2007, August). Integer comparison and the inverse distance effect. In D. S. McNamara & J. G. Trafton (Eds.), *Proceedings of the 29th Annual Cognitive Science Society* (p. 1875). Austin, TX: Cognitive Science Society.

Wagster, J., Tan, J., Wu, Y., Biswas, G., & Schwartz, D. L. (2007). Do learning by teaching environments with metacognitive support help students develop better learning behaviors? The Proceedings of the 29th Meeting of the Cognitive Science Society (pp. xxx-xxx). August, Nashville, USA.

Okita, S.Y., Bailenson, J., Schwartz, D. L. (2007). The mere belief of social interaction improves learning. In D. S. McNamara & J. G. Trafton (Eds.), The Proceedings of the 29th Meeting of the Cognitive Science Society (pp. 1355-1360). August, Nashville, USA.

Schwartz, D. L. (2006). Learning by producing diagrams. In D. Barker-Plummer, R. Cox, and N. Swoboda (Eds). *Diagrammatic representation and inference: 4th international conference, Diagrams 2006* (p. 12). Lecture notes in computer science, Germany, Berlin: Springer.

Okita, S. Y., Schwartz, D. L. (2006). Learning by Teaching: When passive observing through a medium can be effective than doing, Proceedings of the 5th International Conference of the Cognitive Science (ICCS) Vancouver, Canada (July 26, 2006)

Varma, S., Schwartz, D. L. (2006). Is Neuroscience a Learning Science, In S. Barab, K. Hay, D. Hickey (Eds.),7th International Conference of the Learning Sciences: Vol. 2.(pp.792-798). New Jersey: Lawrence Erlbaum Associates.

Davis, J., Lee, T., Vye, N., Bransford, J., Schwartz, D. L. (2006). The Role of People Knowledge in Learning Narrative and Domain Content, In S. Barab, K. Hay, D. Hickey (Eds.),7th International Conference of the Learning Sciences: Vol. 2.(pp.914-915). New Jersey: Lawrence Erlbaum Associates.

Okita, S. Y., Schwartz, D. L., (2006) When observation beats doing: Learning by Teaching, Proceedings of the 7th International Conference of the Learning Sciences (ICLS) Bloomington, IN

Okita, S. Y., Schwartz, D. L., Shibata, T., & Tokuda, H. (2005). Exploring young children's attributions through entertainment robots. The 14th IEEE International Workshop on Robot and Human Interactive Communication, (pp. 390-395). Nashville, TN.

Biswas, G., Leelawong, K., Belynne, K., Viswanath, K., Vye, N., Schwartz, D., & Davis, J. (2004). Developing Learning by Teaching Environments that support Self-Regulated Learining. In J. Lester (Eds.), Proceedings of the 7th International Conference on Intelligent Tutoring Systems (pp. Xxx-xxx). Maceio, Brazil.

Biswas, G., Leelawong, K., Belynne, K., Viswanath, K., Vye, N., Schwartz, D., & Davis, J. (2004). Incorporating self-regulated learning techniques into learning by teaching environments. In xxxx (Eds.), xxxx: Proceedings of the Cognitive Science conference (pp. 120-125). Chicago, IL.

Blair, K. P., & Schwartz, D. L. (2004). Milo and J-Mole: Computers as constructivist teachable agents. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herra (Eds.) Proceedings of the 6th International Conference of the Learning Sciences (p. 588). Mahwah, NJ: Erlbaum.

Leelawong, K., Davis, J., Vye, N., Biswas, G., Schwartz, D., Katzelberger, T., & Bransford, J. (2002). The effects of feedback on learning by teaching in a teachable agent environment. In P. Bell, R. Stevens, & T. Satwicz (Eds.), Keeping Learning Complex: The Proceedings of the 5th International Conference of the Learning Sciences (ICLS) (pp. 245-252). Mahwah, NJ: Erlbaum.

Schwartz, D. L. (2001). Coordinating models and actions. In G. Biswas (Ed.), AAAI Qualitative Reasoning Workshop. (pp. 36-42). San Antonio, TX.

Leelawong, K., Wang, Y., Biswas, G., Vye, N., Bransford, J.D., & Schwartz, D. L. (2001). Qualitative reasoning techniques to support learning by teaching: The teachable agents project. In G. Biswas (Ed.), AAAI Qualitative Reasoning Workshop. (pp. 73-81). San Antonio, TX.

Brophy, S., Biswas, G., Katzlberger, T., Bransford, J., & Schwartz, D. (1999). Teachable Agents: Combining Insights from Learning Theory and Computer Science. In S. P. Lajoie and M. Vivet (Eds.), Artificial intelligence in education (Vol. 50 of J. Breuker, R. Lopez de Mantaras, S. Ohsuga, & W. Swartout (Series Eds.), Frontiers in Artificial Intelligence and Applications). (pp. 21-28). Amsterdam, IOS Press.

Moore, J. L., & Schwartz, D. L. (1998). On learning the relationship between quantitative properties and symbolic representations. In A. Bruckman, M. Guzdial, J. Kolodner, &A. Ram (Eds), *Proceedings of the International Conference of the Learning Sciences* (pp. 209-214). Charolttesville, VA: Association for the Advancement of Computing in Education.

Brophy, S. P., & Schwartz, D. L. (1998). Interactive Analogies. In A. Bruckman, M. Guzdial, J. Kolodner, &A. Ram (Eds), *Proceedings of the International Conference of the Learning Sciences* (pp. 56-62). Charolttesville, VA: Association for the Advancement of Computing in Education.

Schwartz, D. L. & Hegarty, M. (1996). Coordinating multiple representations for reasoning about mechanical devices. In P. L. Olivier (Ed.) *Spring symposium on cognitive and computational models of spatial representations* (pp. 101-109). Stanford, CA: AAAI Press.

Moore, J. L. & Schwartz, D. L. (1994) Mental models for proportional reasoning. *Proceedings of the 16th Annual Conferences of the Cognitive Science Society* (pp. 640-645). Hillsdale, NJ: Erlbaum.

Schwartz, D. L., & Buckley, J. (1990). The interplay of interactivity and motivation in educational software. In D. W. Dalton (Ed.), *Proceedings of the 32nd Annual Conference of the Association for the Development of Computer-based Instructional Systems* (p. 388-392). Columbus, OH: ADCIS.

## International Invited Addresses

Schwartz, D. L. (November 2019). Advances in the Science of Learning. GES Conference, Beijing.

Schwartz, D. L. (August, 2019). Artificial Intelligence in Education. International Conference on Artificial Intelligence, Shanghai.

Schwartz, D. L. (November, 2014). Learning technologies to understand and improve the human mind (brain). Lund University, Sweden.

Schwartz, D. L. (July, 2013). Induction. Presentation at EPFL, Switzerland.

Schwartz, D. L. (October, 2012). Assessing informal learning. Presentation to the Wellcome Trust, London.

Schwartz, D. L. (April, 2012). Cognitive Science and education. Presentation at the Swedish Cognitive Science Society.

Schwartz, D. L. (March, 2012). Technology and learning. Presentation to faculty and dignitaries at the University of Beijing.

Schwartz, D. L. (March, 2011). The happy triangle. Keynote address for the TELS Alpine Rendez-vous. La Clusaz, French (Alps!).

Schwartz, D. L. (June, 2010). When educators do neuroscience. Keynote address for the opening of the Center for Educational Neuroscience, University College London.

Schwartz, D. L. (May, 2010). Why typical instruction overshadows learning. Presentation to the STEM faculty of the University of British Columbia, Vancouver.

Schwartz, D. L. (March, 2010). Missed in Plain Sight. Presentation to the Faculty of the National Institute of Education, Singapore.

Schwartz, D. L. (February, 2010). Teaching Big Ideas in Science and Math. Presentation to the faculty of Oxford University, School of Education, UK.

Schwartz, D. L. (November, 2009). The Effects of Instruction on Transfer. Presentation to the faculty of Lund University, Sweden.

Schwartz, D. L. (April, 2008). What can transfer teach us about science instruction. Presentation to the science faulty at the University of British Columbia, Vancouver.

Schwartz, D. L. (December, 2007). Trajectories to Adaptive Expertise. Presentation at the Royal Swedish Academy of Sciences, Learning Sciences in the 21st Century. Stockholm, Sweden.

Schwartz, D. L. (December, 2007). The Mere Belief of Social and Learning in Virtual Reality. Presentation to the faculty of Lund University, Sweden.

Schwartz, D. L. (September, 2007). Sociable Learning Technologies. Presentation to the faculty of Trollhättan University, Sweden.

Schwartz, D. L. (July, 2005). Interactivity and Learning. Keynote at the *Annual Meeting of Artificial Intelligence in Education*. Amsterdam.

Schwartz, D. L. (May, 2005). Beliefs in Motor Imagery. Invited address at the *Workshop on Motor Imagery*. LPPA College du France, Paris.

Schwartz, D. L. (August, 2003). Emergence in Visualization. Keynote at the *Workshop on Interactive Graphical Communication*. Queen Mary University, London.

Schwartz, D. L. (May, 2002). Tools and transfer. Keynote speaker at *the Cross-Disciplinary Symposium on Learning*. Lund, Sweden.

Schwartz, D. L. (March, 2000). Overcoming barriers to prescriptive learning theory. Keynote speaker at the *Symposium on Education, Cognition and Communication Technology.* Stockholm, Sweden.

Schwartz, D. L. (February, 2000). Managing Complex Instruction. Presentation to the faculty of *Chukyo University*, Nagoya, Japan.

Schwartz, D. L. (February, 2000). Developing Understanding. Presentation to the Faculty of *Keio University*, Tokyo, Japan.

Schwartz D. L. (October, 1997). Uncooperative Agents among Humans and Machines. Plenary address to the *European Science Foundation: Human and Machine Learning*, Manheim, Germany.

Schwartz, D. L. (October, 1996). The effort after shared meaning. Invited address to *European Science Foundation: Task Force on Collaborative Learning,* Hecthoven, Belguim.

Schwartz, D. L. (July, 1995). Assessing knowledge in pieces: Implications for the design of formative assessment in the domain of statistics. Invited address to *The Statistical Working Group of the National Council of Research in Science and Mathematics Education*, Montreal, Canada.

## National Invited Addresses

Schwartz, D. L. (2024). Efficiency and Innovation in the Age of AI. ASU/GSV. San Diego, CA.

Schwartz, D. L. (2023). The Scientific Revolution in Learning. ASU/GSV. San Diego, CA.

Schwartz, D. L. (2022). How the body enables the mind to surpass itself. Invited Lifetime Achievement Award address. American Psychological Association, Minnesota, MI.

Schwartz, D. L. (2016, April). Prior knowledge: You can't live with it, and you can't live without it. Invited Sylvia Scribner Award address. AERA, Washington DC.

Schwartz, D. L. (2015, March). Walking and creativity. University of Indiana, Bloomington.

Schwartz, D. L. & Cutumisu, M. (2014, April). Choice-based assessments of preparation for future learning. Invited Presidential Symposium, New ways to evaluate mathematics and science education. AERA, Philadelphia.

Schwartz, D. L. (2014, April). The science of learning meets the learning sciences. Invited Presidential Symposium, The sciences of learning, the educational sciences, and AERA: Strange bedfellows or all in the family. AERA, Philadelphia.

Schwartz, D. L. (2012, Dec.) Transfer across disciplines. Presentation to the science faculty of Carleton College.

Schwartz, D. L. (2012, July). I am not here to bury lectures.. Presentation to the faculty of Yale University.

Schwartz. D. L. (2012, March). Negative transfer. Presentation to the faculty and students of Arizona State University.

Schwartz, D. L., Tsang, J. M., & Varma, S. (2011, August). Conceptual Development in Mathematics. New York Academy of Science, Aspen Brain Forum, Aspen, CO.

Schwartz, D. L. (2010, December). A kid's eye view of assessment. Presentation at the Annual Education Conference and Trade Show. San Francisco, CA.

Schwartz, D.L. (November, 2010). Trajectories of efficiency and innovation in the teaching and learning. Annual Teaching Excellence Address to the Faculty of Arts & Science at the University of Pittsburgh, Pittsburgh, PA.

Schwartz, D. L. (November, 2010). Does what happens in VR stay in VR? Presentation to the National Center for Technology Innovation. Washington, DC.

Schwartz, D. L. (November, 2010). A kid's-eye view of assessment. Presentation to the National Center for Technology Innovation. Washington, DC.

Schwartz, D. L. (May, 2010). Assessments and beliefs about learning. Presentation to the Annual Meeting of the Education Writers Association. San Francisco, CA.

Schwartz, D. L. (April, 2010). Negotiating a win-win relationship between mathematics education and neuroscience. Opening keynote at the annual meeting of the National Council for the Teaching of Mathematics (NCTM), San Diego.

Schwartz, D. L. (April, 2010). Neuroscience, Mathematics, and Education. Presentation to the faculty and students of Portland State University, Portland.

Schwartz, D. L. (January, 2010). Agent v. Avatar: The effects of simply believing a virtual interaction is social. Presentation to the faculty and students of Temple University, Philadelphia.

Schwartz, D. L. (September, 2009). Trajectories to adaptive expertise and its significance for assessment. Presentation to the IES training fellows at UW Madison.

Schwartz, D. L. (September, 2009). Why typical instruction undermines transfer and what to do about it. Presentation to the cognitive science faculty of UW Madison.

Schwartz, D. L. (June, 2009). Knowledge foundations for adaptive learning. Presentation to the researchers of TRADOC, US Army. Videoconference to 8 locations.

Schwartz, D. L. (May, 2009). Demand side assessments. Presentation to the researchers and funders at Games for Change. Parsons School of Design, NYC.

Schwartz, D. L. (April, 2009). Ways to improve engineering instruction. Presentation to the Engineering faculty of Northwestern University. Chicago, IL.

Schwartz, D. L. (February, 2009). Methods of Innovation. Panel presentation at the NSF REESE PI meeting. Washington, DC.

Schwartz, D. L. (November, 2008). Freeing assessment from the knowledge box. Presentation at the MacArthur meeting on assessment. Arizona State University, Phoenix, AZ.

Schwartz, D.L. (November, 2008). Sociable technologies that bind cognition and social engagement. Presentation to the education faculty, University of Colorado, Boulder, CO.

Schwartz, D. L. (November, 2008). How transfer research can help college-level science instruction. Presentation to the science faculty, University of Colorado, Boulder, CO.

Schwartz, D. L. (October, 2008). Mismeasures of learning in school and workplace. Presentation at the annual meeting of the Science of Learning Center leadership. National Science Foundation, Washington D.C.

Schwartz, D. L. (September, 2008). Why direction instruction earns a C- in transfer. Presentation to research panel on adolescent learning. National Science Foundation, Washington DC.

Schwartz, D. L. (August, 2008). Has technology changed the way people learn? Presentation to the Knowledge Alliance, Albuquerque, NM.

Schwartz, D.L. (March, 2008). A vision for how LRDC should lead the field. Presentation to the faculty and students of the University of Pittsburgh's Learning, Research and Development Center.

Schwartz, D. L. (October, 2007). An Abstract to Concrete Shift. Presentation to the Cognitive Science program at University of Indiana, Bloomington.

Schwartz, D. L. (October, 2007). Sociable Learning Technologies. Presentation to the Learning Science faculty at University of Illinois Chicago.

Schwartz, D. L. (October, 2007). Solving the transfer problem in statistics instruction. Presentation to the education faculty of University of Minnesota.

Schwartz, D. L. (July, 2007). Learning is not the same thing as problem solving. Keynote address to the annual meeting of the *Physics Education Research Conferences*, Greensborough, NC.

Schwartz, D. L. (June, 2007). Dynamic transfer. Presentation to the faculty of Carnegie Mellon University., Pittsburgh, PA.

Schwartz, D. L. (November, 2006). Adaptation and learning with new technologies. Presentation at the Learning and Brain Conference, San Francisco, CA.

Schwartz, D. L. (November, 2006). Technology and Learning: Old wine in a new bottle?. Presentation to the Annual Awards Banquet of the Gruss Foundation. Long Island, NY.

Schwartz, D. L. (July, 2006). Learning in the Digital Age. Keynote address to the annual meeting of the Pearson Corporation, Phoenix, AZ.

Schwartz, D. L. (June, 2006). Simulations with diagrams. Keynote address at the Fourth International Diagrams Conference. Stanford University, CA.

Schwartz, D. L. (December, 2005). Is there any place for a theory of agency in learning? Invited address at Carnegie Melon University, PIER program.

Schwartz, D. L. (August, 2004). Transfer and the hidden value of original student production. Keynote at the *Physics Education Research Conference*, Sacramento, CA.

Schwartz, D. L. (June, 2004). Innovation and Efficiency in Educational Research: An Example from Statistics Instruction. Presentation at the *Carnegie Symposium*, Pittsburgh, PA.

Schwartz, D. L. (July, 2003). Real-time Imagery. Presentation to scientists at NASA, Ames, CA.

Schwartz, D. L. (March, 2003). Other forms of knowledge under the sun. Presentation to the Education Faculty at San Diego State University.

Schwartz, D. L. (March, 2003). Earlier forms of knowledge. Presentation to the Education Faculty at University of California, Berkeley.

Schwartz, D. L. (May, 2002). The significance of timing and beliefs in imagery. Presentation to the Psychology Faculty at University of California, Santa Barbara

Schwartz, D. L. (April, 2002). When thoughts need action. Presentation to the Cognitive Science Faculty at Georgia Tech, Atlanta.

Schwartz, D. L. (May, 2001). Visualization. Presentation to the faculty of Cognitive Science, at University of California, San Diego.

Schwartz, D. L., Lin, X. D., Brophy, S., & Bransford, J.D. (April, 1999). Flexibly adaptive instructional design. Invited Presidential Symposium Address: Current applications of instructional design and theory in technology. *Annual Meeting of the American Educational Research Association [AERA]*, Montreal.

## Grants

2021-2022 National Science Foundation (DUE). *Science to Support Adult Working Learners. Co-PI*.

2021-2025 Gordon and Betty Moore Foundation. *Virtual Field Trips.* **PI**

2020-2025 NASA. *Real World, Real Science: Using NASA data to explore weather and climate. Co-PI.*

2019-2020 Human-Centered Artificial Intelligence Institute (Stanford). *Automating feedback*. **PI**

2019-2020 Media-X (Stanford). *An ontology for choice-based assessments.* **PI**

2017-2020 M&M Wallenberg Foundation. *Maximizing informativeness, minimizing neglect*. **PI**.

2016-2019 National Science Foundation (EHR). *C-STEM$^3$ Co-PI.*

2016-2020 NASA. *Real World, Real Science: Using NASA data to explore weather and climate. Co-PI.*

2015-2017 Moore Foundation. *Improving and assessing learner's preparation for future learning*. **PI.**

2014-2017 Department of Education (IES). *Designing Contrasting Cases for Inductive Learning*. **PI.**

2014-2015 Moore Foundation. *Experimentally Validating Choice-based Assessments.* **PI.**

2013-2015 National Science Foundation (EHR). *Measuring the benefits of informal experiences.* **PI**.

2013-2014 Moore Foundation. *Pioneering Next Generation Science Assessments*, **PI**.

2012-2015 National Science Foundation (EHR). *Nimble Assessments.* **PI.**

2012-2013 Stanford University On-Line Initiative. *Inductive Learning and Statistics.* **PI.**

2012-2013 Moore Foundation. *Towards an integrative theory of cognition and motivation.* **PI.**

2012-2014 National Science Foundation (CCF). *Socially assistive robots*. Co-PI.

2012-2015 Hewlett Foundation. *PhET interactive simulations in mathematics.* Co-PI.

2011-2014 Wallenberg Foundation. *WiNI.* Co-PI.

2011-2014 National Science Foundation (SLC). *LIFE center renewal.* Faculty Investigator.

2011-2012 Media-X. *EteRNA: Accelerating knowledge creation.* Co-PI.

2010-2012 MacArthur Foundation. *Digital Assessments for Informal and Formal Pursuits.* **PI.**

2010-2013 National Science Foundation (EHR). *Expanding PhET Interactive Science Simulations to Grades 4-8: A Research-based Approach.* Co-PI.

2010-2012 Bio-X, Stanford. *Biotic Games*. Co-PI.

2009-2012 National Science Foundation (IIS). *Choice-adaptive intelligent learning environments.* **PI.**

2009-2010 National Science Foundation (SLC). *LIFE center.* ***CO-DIRECTOR***, Co-PI.

2008-2012 National Science Foundation (EHR). *Cognitive and cortical restructuring in the acquisition of negative number concepts*. **PI**.

2008-2012 WGLN III. *Talking and Seeing Math in Games*. **PI.**

2008-2010 McArthur Foundation. *Assessing 21st Century Skills*. Faculty Investigator.

2008-2009 K-12 Initiative, Stanford. *Biological Database Explorer*. Co-PI.

2007-2009 National Science Foundation (EHR). *The Ideal Student.* Co-PI.

2007-2008 National Science Foundation (SGER). *Educational neuroscience of integers understanding*, **PI**.

2006-2009 National Science Foundation (EHR). *Assessing and Assisting Science Learning*. **PI**.

2006-2009 Dept. of Education (IES). *Learning by Teaching for Self-Regulation*. Co-PI.

2004-2009 National Science Foundation (SLC). *LIFE center*. Faculty Lead.

2006-2007 WGLN. *Planning grant: Teachable Agent Games for Early Math*. **PI**.

2004-2007 National Science Foundation (EHR). *Biological bases of alphanumeric learning*. Co-PI.

2003-2006 National Science Foundation (EHR). *Exploring the value of learning by teaching*. **PI**.

2002-2006 National Science Foundation (BCS). *How external representations propel development and future learning*. **PI.**

2002-2006 National Science Foundation (BCS). *The effects of action and knowledge on spatial inference*. **PI.**

2004-2005 Media-X, Stanford. *Benevolent Demon*: *A hidden conductor for orchestrating learning interactions.* **PI**.

2003-2004 Media-X, Stanford. *A teachable agent for learning management training*. **PI.**

2000-2003. National Science Foundation (EHR). *Inventing to Prepare for Learning*. **PI.**

2002-2003 Stanford Center for the Study of Language and Information. *Intelligent pupil adventure games that sustain learner-agent interactions*. **PI**.

2001–2002 Stanford Center for the Study of Language and Information. *Willful Pupil Project*. **PI**

2001-2002 Spencer Foundation. *A Study of Virtual Learning Spaces that Unite Teachers from Different Cultures in their Practices of Instruction.* Co-PI.

1999-2002. National Science Foundation (KDI). *Teachable Agents*. Co-PI.

1999-2000. Department of Education. *Information Technology & Teacher Education*. Investigator

1999-2000. Office of Naval Research. *Assessing understanding of AC Circuitry*. Co-PI.

1999-2000. National Science Foundation. *Center for Bioengineering*. Faculty Investigator.

1997-2000. Department of Education. *Development of an Intelligent Learning Environment for Training of Clinical Audiology Students*. Faculty Investigator.

1998-1999. National Science Foundation (EHR). *Supplement to Scientists in Action*. Faculty Investigator.

1997-1999. Department of Health and Human Services. *Patient Care Provider Order Entry with Tactical Support.* Faculty Investigator.

1996-1999. Department of Education. *Contrasting Cases*. Co-PI.

1996-1998. Office of Naval Research. *Qualitative Understanding of AC Circuitry*. Co-PI.

1993-1996. National Science Foundation (EHR). *Scientists in Action*. Faculty Investigator.

1994-1995. Lilly Foundation. *Pattern-to-Theory Instruction*. Lilly Teaching Fellow.

1994-1995. National Science Foundation. *CEMSTEAT Planning Grant.* Co-PI.

1993-1994. Peabody Faculty Development Grant. *Statistical Literacy Project*.

1993-1994. Vanderbilt University Research Council. *Transfer Effects of Induction.*

## Honors

Students' Best Paper Awards: Anna Rafferty (AI in Ed), Brian Lukoff (AERA), Sandra Okita (ICLS), Cathy Chase (ICLS), Maria Cutumisu (CELDA)

2023 Inaugural Halper Family Faculty Director Stanford Accelerator for Learning, *Stanford.*

2022 Distinguished Teachers College Psychology Alum, *Columbia University*, NY

2021 Klaus Jacobs Research Prize. *Jacobs Foundation*, Switzerland

2021 Career Achievement Award in Educational Psychology, *American Psychological Association*.

2016 NPR Best Books, *ABCs of How We Learn*

2015 Teacher of the Year, *Stanford Graduate School of Education*

2015 Sylvia Scribner Award, *American Educational Research Association*, Division C

2014 Inaugural Nomellini-Olivier Chair in Educational Technology

2011 Graduate Advisor of the Year, *Stanford Graduate School of Education.*

2001 Article of the Year. Review of Research in Education, *American Educational Research Association*. Rethinking transfer: A Simple Proposal with Multiple Implications.

2001 Research Article of the Year. *Association for Educational Computing and Technology*. Software for Managing Complex Learning: An Example from an Educational Psychology Course.

2000. Benefactor of the Commons. Peabody College, Vanderbilt University.

1994 - 1995. Lilly Teaching Fellow, *Vanderbilt University*

1989 - 1992. Inaugural Ben D. Wood Fellow, *Columbia University*

1984 - 1985. Chief Negotiator, *Middle Yukon Educational Association*, Alaska

1979 - 1980. Outstanding Young Teacher Award, *Alumni of the School of Education, University of Southern California*

## Professional Service

### Ad Hoc Reviewer

Academic Medicine • Applied Cognitive Psychology • American Educational Research Association • Cambridge University Press • Child Development • Cognitive Psychology • Cognitive Science • Cognition and Instruction • Computer Supported Collaborative Learning • Developmental Psychology • Discourse Processes • Educational Psychologist • Experimental Psychology • Instructional Science • Intelligent Tutoring Systems • Journal of Child Development • Journal of Cognition and Development • Journal of Educational Psychology • Journal of

Experimental Psychology: Applied • Journal of Experimental Psychology: Learning, Memory, & Cognition • Journal of Experimental Psychology: General • Journal of Experimental Child Psychology •Journal of the Learning Sciences • Journal for Research in Mathematics Education • Journal of Research in Science Teaching • LEA book titles • Learning & Instruction • Medical Education • Memory & Cognition • Mind, Culture, and Activity • Neuropsychologia • NIE Singapore • NIH • Netherlands PROO • NSF-BCS • NSF-EHR • NSF-Career • Perception • PLOS One • PNAS • Presence • Psychological Methods • Psychological Science • SCIENCE • Spencer Foundation • SSHRCanada • Swiss NSF • Taiwan NSC • Teaching and Learning in Medicine • TOCHI • Trends in Cognitive Science

Boards, Panels, and Industry Advising

Cognition & Instruction • Educational Research Review • Glasslab • Connected Learning • Journal of the Learning Sciences • LAIX • International Conference for Artificial Intelligence in Education • International Conference of the Learning Sciences • International Workshop on Qualitative Modeling • Klaus Jacobs Conference Chair • Kid Adaptive • NRC Report on Gaming & Simulations • NSF Workshop Panels on Transfer and on Expertise • PCAST Working Group on STEM Instruction • NRC How People Learn II • Stanford Center for Innovations in Learning • AAAI Symposium on Diagrammatic Reasoning • Pearson Digital • TAL • Wiley Visual Series • LeapFrog • Sundry NSF & IES grants • NSF Cyberleaning Review Panel • Wallenberg Foundation (Chair WASP-HS International Scientific Advisory Board)

## Teaching at Stanford

Core Mechanics for Learning • Assessing Technologies for Learning • Methods in Psychological Studies in Education • Educational Neuroscience • Colloquium on Child Learning and Development • Colloquium on Learning Sciences, Technology, & Design • Cognition for Learning • Agency in Humans and Machines • Transfer of Learning • Spatial Learning • Quantitative Reasoning • Interactivity in Learning • Play • Feedback • Discovery and Innovation • Visualizations for Learning • Human Induction and Statistics • Introductory Statistics for Doctoral Students

## Teaching at Vanderbilt

Undergraduate Courses
Research Methods • Systematic Inquiry • Educational Psychology • Visualization • Transfer • Creativity & Discovery

Graduate Courses
Human Cognition • Induction • Culture, Cognition, & Technology • Mental Models • Transfer • Imagery