CURRICULUM VITAE

James C. Lester

Department of Computer Science
North Carolina State University
890 Oval Dr., Box 8206, Engineering Building II
Raleigh, NC 27695-8206

Tel: 919-515-7534
Fax: 919-515-7896
Email: lester@ncsu.edu
URL: www.cei.ncsu.edu

Professional Experience

2023–present **Goodnight Distinguished University Professor in Artificial Intelligence and Machine Learning**, North Carolina State University.

2019–2023 **Distinguished University Professor**, Computer Science, North Carolina State University.

2012–2019 **Distinguished Professor**, Computer Science, North Carolina State University.

2009–present **Professor**, Computer Science, North Carolina State University.

2000–2006 **Chief Scientist**, LiveWire Logic, Inc.

1999–2009 **Associate Professor**, Computer Science, North Carolina State University.

1994–1999 **Assistant Professor**, Computer Science, North Carolina State University.

Education

1994 **Ph.D.**, Computer Science, University of Texas at Austin.

1988 **M.S.C.S.**, Computer Science, University of Texas at Austin.

1986 **B.A.**, Computer Science, University of Texas at Austin.
Highest Honors, Phi Beta Kappa.

1983 **B.A.**, History, Baylor University.
Honors Program with Distinction.

Research Interests

- ARTIFICIAL INTELLIGENCE: AI & Education, Computational Models of Narrative, Multimodal Interaction, AI & Digital Games, Affective Computing, Natural Language Processing.
- EDUCATION: AI-Enabled Learning, Narrative-Centered Learning Environments, Multimodal Learning Analytics, Game-Based Learning, K-12 STEM Education, Collaborative Learning, Self-Regulated Learning.

Honors and Awards

- Best Paper Award, Twelfth International Conference on Games and Learning Alliance, 2023.
- Alexander Quarles Holladay Medal for Excellence, North Carolina State University, 2022.
- Research Leadership Academy, North Carolina State University, 2022.
- Alumni Association Outstanding Research Award, North Carolina State University, 2022.

- Distinguished Dozen Article, *Journal of Adolescent Health*, 2020.
- Best Student Paper Award, Thirteenth International Conference on Educational Data Mining, 2020.
- Outstanding Practice Award, Association for Educational Communications and Technology, 2020.
- Best Education Paper Award, Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC), 2019.
- IFAAMAS Influential Paper Award, International Foundation for Autonomous Agents and Multiagent Systems, 2017.

  IFAAMAS Award Citation: "This paper was instrumental in beginning a field, it influenced other areas and disciplines (AI in Education, Virtual Agents), and it continues to be relevant many years later."
- TICL Outstanding International Research Collaboration Award, American Educational Research Association, Technology, Instruction, Cognition, & Learning SIG, 2017.
- Best Paper Award, Twenty-Third Conference on User Modeling, Adaptation, and Personalization, 2015.
- AAAI Fellow, Association for the Advancement of Artificial Intelligence, 2014.

  AAAI Fellow Citation: "For significant and sustained contributions to artificial intelligence technologies for education."
- James Chen Best Student Paper Award, Twenty-First Conference on User Modeling, Adaptation and Personalization, 2013.
- Best Paper Award, Seventh AAAI International Conference on Artificial Intelligence and Interactive Digital Entertainment, 2011.
- Best Student Paper Award, International Conference on Affective Computing & Intelligent Interaction, 2009.
- Best Student Paper Award, Thirteenth International Conference on Artificial Intelligence in Education, 2007.
- Outstanding Paper Award, Twelfth World Conference on Educational Multimedia, Hypermedia, and Telecommunications, 2000.
- Best Paper Award, ACM International Conference on Intelligent User Interfaces, 1999.
- ACM Recognition of Service Award, Association for Computing Machinery, 1999.
- North Carolina State University Academy of Outstanding Teachers, 1998-present.
- North Carolina State University Outstanding Teacher Award, 1998.
- Best Paper Award, Eighth World Conference on Artificial Intelligence in Education, 1997.
- NSF CAREER Award, National Science Foundation, 1997.
- Outstanding New Teacher Award, Dept. of Computer Science, North Carolina State University, 1995.
- Artificial Intelligence Laboratory Doctoral Fellowship, University of Texas at Austin, 1986.

Professional Societies

- Association for Advancement of Artificial Intelligence (AAAI).
- Association for Computing Machinery (ACM).
- International Artificial Intelligence in Education Society (IAIED).
- Institute of Electrical and Electronics Engineers (IEEE).

Sponsored Research Activity

- U.S. Army Futures Command
  Project: *CompGen: Competency-based Generation of Synthetic Training Scenarios for the Schoolhouse*, 2023-2026.
  Role: Principal Investigator. (Co-PIs: W. Min, B. Mott, J. Rowe, A. Smith)
  Award: $1,449,415

- National Science Foundation (Improving Undergraduate STEM Education Program)
  Project: *Transforming Introductory Computer Science Instruction with an AI-Driven Classroom Assistant*, 2023-2027.
  Role: Co-principal Investigator (PI: B. Akram; Co-PIs: B. Mott, J. Vandenberg)
  Multi-PI Collaborative Project:
  Collaborating Institution: University of California – Berkeley.
  Collaborating PI: N. Norouzi.
  Total Award: $1,999,637
  Award: $1,723,467

- National Science Foundation (Improving Undergraduate STEM Education Program)
  Project: *ExplainIt: Improving Student Learning with Explanation-based Classroom Response Systems*, 2021-2025.
  Role: Principal Investigator. (Co-PI: W. Min)
  Multi-PI Collaborative Project:
  Collaborating Institution: Indiana University.
  Collaborating PI: G. Ozgul.
  Total Award: $1,856,521.
  Award: $1,456,521.

- National Science Foundation (AI Research Institutes Program)
  Project: *AI Institute for Engaged Learning*, 2021-2026.
  Role: Principal Investigator. (Co-PIs: M. Bansal, G. Biswas, C. Hmelo-Silver, J. Roschelle)
  Award: $19,996,290.

- US Department of Education, Institute of Education Sciences (Cognition and Student Learning Program)
  Project*: Improving Conceptual Knowledge in Upper Elementary Science with Scaffolded Sketch-Based Modeling*, 2021-2025.
  Role: Principal Investigator. (Co-PIs: B. Mott, M. Feng, C. Ringstaff)
  Award: $1,993,601.

- National Institutes of Health (National Cancer Institute)
  Project: *Change Gradients: Promoting Adolescent Health Behavior Change with Clinically Integrated Sample-Efficient Policy Gradient Methods*, 2019-2023.
  Role: Co-principal Investigator & Subcontractor (Co-PI: Jonathan Rowe)
  Prime Institution: University of California – San Francisco.
  PI: E. Ozer.
  Total Award: $973,252.
  Award: $473,443.

- U.S. Army Futures Command
  Project: *TCAT and TeamCoach: Tools for Natural Language-Based Team Communication Assessment and Team Feedback in Collective Synthetic Training Environments*, 2019-2022.
  Role: Principal Investigator (Co-PIs: B. Mott, J. Rowe, R. Spain)
  Award: $2,018,810.

- National Science Foundation (STEM + Computing Partnerships Program)
  Project: *PrimaryAI: Integrating Artificial Intelligence into Upper Elementary Science with Immersive Problem-based Learning*, 2019-2022.
  Role: Principal Investigator. (Co-PI: B. Mott)

Multi-PI Collaborative Project:
Collaborating Institution: Indiana University.
Collaborating PI: K. Glazewski.
Total Award: $1,655,585.
Award: $985,585.

- National Science Foundation (STEM + Computing Partnerships Program)
  Project: *Building Capacity for K-12 Artificial Intelligence Education Research*, 2019-2021.
  Role: Principal Investigator.
  Multi-PI Collaborative Project:
  Collaborating Institution: University of Southern California.
  Collaborating PI: N. Wang.
  Total Award: $299,976.
  Award: $99,976.

- National Science Foundation (Future of Work at the Human-Technology Frontier: Advancing Cognitive and Physical Capabilities Program)
  Project: *Augmented Cognition for Teaching: Transforming Teacher Work with Intelligent Cognitive Assistants*, 2018-2022.
  Role: Principal Investigator. (Co-PI: B. Mott)
  Multi-PI Collaborative Project:
  Collaborating Institution: Indiana University.
  Collaborating PI: K. Glazewski.
  Total Award: $2,999,721.
  Award: $1,499,736.

- National Science Foundation (EHR Core Research Program)
  Project: *Supporting Student Planning with Open Learner Models in Middle Grades Science*, 2018-2021.
  Role: Principal Investigator. (Co-PI: R. Azevedo)
  Award: $1,499,183.

- National Institute of Standards and Technology (Public Safety Innovation Accelerator Program)
  Project: *Investigating Emergency Response Performance with VR-Based Intelligent User Interfaces*, 2018-2020.
  Role: Principal Investigator. (Co-PIs: B. Mott, R. Spain)
  Award: $1,112,175.

- National Science Foundation (Advancing Informal STEM Learning Program)
  Project: *Multimodal Visitor Analytics: Investigating Naturalistic Engagement with Interactive Tabletop Science Exhibits*, 2018-2021.
  Role: Principal Investigator. (Co-PIs: J. Minogue, J. Rowe)
  Award: $1,951,956.

- U.S. Army Research Laboratory
  Project: *DeepGen: Dynamic Generation of Training Simulation Scenarios with Deep Reinforcement Learning*, 2017-2021.
  Role: Principal Investigator. (Co-PIs: B. Mott, J. Rowe)
  Award: $340,857.

- National Institutes of Health (National Institute of General Medical Sciences, Science Education Partnership Award)
  Project: *Health Quest: Engaging Adolescents in Health Careers with Technology-Rich Personalized Learning*, 2017-2022.
  Role: Principal Investigator. (Co-PI: E. Ozer)
  Award: $1,378,755.

- National Science Foundation (EHR Core Research Program)
  Project: *REFLECT: Improving Science Problem Solving with Adaptive Game-Based Reflection Tools*,

2017-2020.
Role: Principal Investigator. (Co-PI: R. Azevedo)
Award: $1,300,000.

- National Science Foundation (EHR Core Research Program)
  Project: *Big Data from Small Groups: Learning Analytics and Adaptive Support in Game-based Collaborative Learning*, 2016-2021.
  Role: Principal Investigator.
  Multi-PI Collaborative Project:
  Collaborating Institution: Indiana University.
  Collaborating PI: C. Hmelo-Silver.
  Total Award: $2,484,146.
  Award: $1,249,611.

- National Science Foundation (Improving Undergraduate STEM Education Program)
  Project: *PRIME: Engaging STEM Undergraduate Students in Computer Science with Intelligent Tutoring Systems*, 2016-2020.
  Role: Principal Investigator. (Co-PIs: B. Mott, E. Wiebe)
  Multi-PI Collaborative Project:
  Collaborating Institution: University of Florida.
  Collaborating PI: K. Boyer.
  Total Award: $1,999,707.
  Award: $1,499,828.

- National Science Foundation (STEM + Computing Partnerships Program)
  Project: *ENGAGE: A Game-based Curricular Strategy for Infusing Computational Thinking into Middle School Science*, 2016-2019.
  Role: Principal Investigator. (Co-PIs: D. Blackburn, K. Boyer, B. Mott, E. Wiebe)
  Award: $2,498,862.

- National Science Foundation (Discovery Research K-12 Program)
  Project: *Guiding Understanding via Information from Digital Environments (GUIDE)*, 2015-2019.
  Role: Co-principal Investigator & Subcontractor (Co-PIs: F. Reichsman, E. Wiebe)
  Prime Institution: The Concord Consortium.
  PI: C. Dorsey.
  Total Award: $2,983,810.
  Award: $1,238,549.

- U.S. Army Research Laboratory
  Project: *Tutorial Planning with Markov Decision Processes for Counterinsurgency Training Environments*, 2015-2018.
  Role: Principal Investigator. (Co-PIs: B. Mott, J. Rowe)
  Award: $1,072,056.

- National Science Foundation (Cyber-Human Systems Program)
  Project: *Adapting to Affect in Multimodal Dialogue-Rich Interaction with Middle School Students*, 2014-2017.
  Role: Principal Investigator. (Co-PIs: K. Boyer, B. Mott, E. Wiebe)
  Award: $1,200,073.

- SAS Institute, Inc.
  Project: *Using Deep Learning to Build Context-Sensitive Language Models*, 2014-2015.
  Role: Principal Investigator. (Co-PI: B. Mott)
  Award: $272,839.

- National Science Foundation (EHR Core Research Program)
  Project: *The Effectiveness of Intelligent Virtual Humans in Facilitating Self-Regulated Learning in STEM with MetaTutor*, 2014-2017.
  Role: Co-principal Investigator. (PI: R. Azevedo)

Award: $1,365,603.

- National Science Foundation (Smart and Connected Health Program)
  Project: *A Self-Adaptive Personalized Behavior Change System for Adolescent Preventive Healthcare*, 2013-2017.
  Role: Principal Investigator.
  Multi-PI Collaborative Project:
  Collaborating Institution: University of California – San Francisco.
  Collaborating PI: E. Ozer.
  Total Award: $2,011,991.
  Award: $968,818.

- Social Sciences and Humanities Research Council of Canada
  Project: *Learning Environments Across Disciplines (LEADS): Supporting Technology Rich Learning Across Disciplines*, 2012-2014.
  Role: Subcontractor
  Prime Institution: McGill University.
  PI: S. Lajoie.
  Award: $46,970.

- U.S. Army Research Laboratory
  Project: *Detection and Transition Analysis of Engagement and Affect in a Simulation-Based Combat Medic Training Environment*, 2012-2015.
  Role: Subcontractor
  Prime Institution: Columbia University.
  PI: R. Baker.
  Award: $478,592.

- National Science Foundation (Computing Education for the 21st Century Program)
  Project: *ENGAGE: Immersive Game-Based Learning for Middle Grade Computational Fluency*, 2012-2014.
  Role: Principal Investigator. (Co-PIs: K. Boyer, B. Mott, E. Wiebe.)
  Award: $1,047,996.

- National Science Foundation (Informal Science Education Program)
  Project: *Investigating an Intelligent Cyberlearning System for Interactive Museum-based Sustainability Modeling*, 2011-2013.
  Role: Principal Investigator. (Co-PIs: P. FitzGerald, J. Minogue, B. Mott)
  Award: $713,384.

- Bill & Melinda Gates Foundation, William and Flora Hewlett Foundation, and EDUCAUSE
  Project: *Promoting Literacy Education in Rural Schools with Intelligent Game-Based Learning Environments*, 2011-2012.
  Role: Principal Investigator. (Co-PIs: C. Brown, R. Conner, E. Hodge, B. Mott, M. Wirth)
  Award: $498,783.

- National Science Foundation (Research & Evaluation on Education in Science & Engineering Program)
  Project: *An Integrated Model of Cognitive and Affective Scaffolding for Intelligent Tutoring Systems*, 2010-2013.
  Role: Principal Investigator. (Co-PIs: K. Boyer, E. Wiebe)
  Award: $1,542,275.

- National Science Foundation (Discovery Research K-12 Program)
  Project: *The LEONARDO Project: An Intelligent Cyberlearning System for Interactive Scientific Modeling in Elementary Science Education*, 2010-2014.
  Role: Principal Investigator. (Co-PIs: M. Carter, B. Mott, E. Wiebe)
  Award: $3,499,410.

- DARPA

Project: *JOUST: Justification for Objectives Using Spoken Text*, 2009-2010.
Role: Subcontractor
Prime Institution: University of Rochester.
PI: J. Allen.
Award: $60,000.

- National Science Foundation (CreativeIT Program)
  Project: *The Narrative Theatre: A Creativity Enhancing Environment*, 2008-2011.
  Role: Principal Investigator. (Co-PI: H. Spires)
  Award: $828,868.

- National Science Foundation (Human-Centered Computing Program)
  Project: *Modeling Student Affect in Game-Based Learning Environments*, 2008-2011.
  Role: Principal Investigator.
  Award: $480,422.

- National Science Foundation (Discovery Research K-12 Program)
  Project: *Developing Science Problem-Solving Skills and Engagement Through Intelligent Game-Based Learning Environments*, 2008-2012.
  Role: Principal Investigator. (Co-PIs: J. Minogue, J. Nietfeld, H. Spires)
  Award: $2,523,297.

- National Science Foundation (Advanced Learning Technologies Program)
  Project: *Bayesian Pedagogical Agents for Dynamic High-Performance Inquiry-Based Learning Environments*, 2007-2009.
  Role: Principal Investigator. (Co-PIs: J. Nietfeld, H. Spires)
  Award: $605,436.

- National Science Foundation (Research on Education, Policy, and Practice Program)
  Project: *Self-Explaining Learning Environments*, 1999-2002.
  Role: Principal Investigator. (Co-PI: P. FitzGerald)
  Award: $645,750.

- National Science Foundation (Learning & Intelligent Systems Program)
  Project: *Animated Pedagogical Agents for Constructivist Learning Environments*, 1997-2000.
  Role: Principal Investigator. (Co-PIs: S. Converse, P. FitzGerald, R. Mayer, H. Spires)
  Award: $600,472.

- National Science Foundation (Interactive Systems Program – NSF CAREER Award)
  Project: *Multimedia Explanation Generators for Knowledge-Based Learning Environments*, 1997-2001.
  Role: Principal Investigator.
  Award: $390,373.

- Novell, Inc.
  Project: *Intelligent Agent Technologies*, 1996.
  Role: Principal Investigator.
  Award: $25,000.

- National Science Foundation (Division of Undergraduate Education)
  Project: *A Laboratory for Teaching Multimedia Technology for Computer Science Majors*, 1995-1997.
  Role: Co-principal Investigator. (PI: D. Reeves)
  Award: $52,100.

Research Supervision

Post-Doctoral Scholars Supervised

- Michael Geden, 2019-2020.

- Wookhee Min, 2016-2018.
- Joseph Grafsgaard (Co-supervisor: K. Boyer), 2014-2015.
- Eun Ha, 2011-2014.
- Kristy Boyer, 2010-2011.
- Lisong Xu, 2002-2003.
- Charles Callaway, 2000-2001.

Doctoral Students Supervised

- Vikram Kumaran, *A Framework for Designing Interactive Narrative Game Levels with Natural Language*, 2024.
- Fahmid Fahid, *An Online Deep RL-Based Pedagogical Planning Framework for AI-Driven Learning Environments*, 2024.
- Daniel Carpenter, *Natural Language Analysis of Student Reflection in Game-Based Learning*, 2023.
- Kyungjin Park, *Automated Detection of Disruptive Talk in Collaborative Game-Based Learning Environments*, 2022.
- Nathan Henderson, *Deep Learning-Based Multimodal Affect Detection for Adaptive Learning Environments*, 2022.
- Andrew Emerson, *Multimodal Learning Analytics for Predictive Student Modeling in Game-Based Learning*, 2022.
- Andrew Smith, *Automated Assessment and Predictive Student Modeling for Drawing in Science Education with Deep Learning*, 2020.
- Bita Akram (Co-advisor: Eric Wiebe), *Assessment of Students' Computer Science Focal Knowledge, Skills, and Abilities in Game-Based Learning Environments*, 2019.
- Pengcheng Wang, *Deep Reinforcement Learning for Interactive Narrative Planning*, 2018.
- Wookhee Min, *Generalized Goal Recognition Framework for Open-World Digital Games*, 2016.
- Samuel Leeman-Munk, *Morphosyntactic Neural Analysis for Generalized Lexical Normalization*, 2016.
- Joseph Grafsgaard (Co-advisor: Kristy Boyer), *Multimodal Affect Modeling in Task-Oriented Tutorial Dialogue*, 2014.
- Alok Baikadi, *Discovery-based Goal Recognition in Interactive Narrative Environments*, 2014.
- Jennifer Sabourin, *Stealth Assessment of Self-Regulated Learning in Game-Based Learning Environments*, 2013.
- Jonathan Rowe, *Narrative-Centered Tutorial Planning with Concurrent Markov Decision Processes*, 2013.
- Julius Goth, *Intrasentential Grammatical Correction with Weighted Finite State Transducers*, 2013.
- Seung Lee, *Modeling Director Agents' Decision-Making Strategies in Guided Discovery Learning Environments*, 2012.
- Eun Ha, *Modeling Discourse Structure and Temporal Event Relations with Markov Logic Networks*, 2011.
- Kristy Boyer (Co-advisor: Mladen Vouk), *Structural and Dialogue Act Modeling in Task-Oriented Tutorial Dialogue*, 2010.

- Scott McQuiggan, *An Inductive Framework for Affect Recognition and Expression in Interactive Learning Environments*, 2008.
- Sunyoung Lee (Co-advisor: Carla Savage), *Early Prediction of Student Goals and Affect in Narrative-Centered Learning Environments*, 2008.
- Bradford Mott (Co-advisor: Michael Young), *Decision-Theoretic Narrative Planning for Guided Exploratory Learning Environments*, 2006.
- Wei Zhang (Co-advisor: Michael Young), *Multimodal Pedagogical Planning for 3D Learning Environments*, 2004.
- Charles Callaway, *Narrative Prose Generation*, 2000.
- William Bares (Co-advisor: Woodrow Robbins), *Realtime Generation of User- and Context-Sensitive Three-Dimensional Animations*, 1998.

Masters Students Supervised

- Michael Wallis (Co-advisor: Kristy Boyer), *JavaTutor – A Remotely Collaborative, Real-Time Distributed Intelligent Tutoring System for Introductory Java Computer Programming – A Qualitative Analysis*, 2011.
- Robert Phillips, *Code Understanding for an Intelligent Tutoring System*, 2011.
- Lucy Shores, *The Role of Cognitive and Metacognitive Tool Use in Narrative-Centered Learning Environments*, 2010.
- Rachel Dwight (Co-advisor: Nancy Green, UNC-Greensboro), *Microplanning and Linguistic Realization for Natural Language Generation in a Biomedical Domain*, 2009.
- Kanyamas "Jenny" Navoraphan (Co-advisor: Nancy Green, UNC-Greensboro), *Argument Generation for a Biomedical Domain*, 2008.
- Scott McQuiggan, *An Inductive Approach to Modeling Affective Reasoning in Interactive Synthetic Agents*, 2005.
- Seung Lee, *A Framework for Real-Time Synchronization in Intelligent Media Generators*, 2004.
- Randy Casstevens, *Explorations in Three-Dimensional User Interfaces for Learning Environments*, 2003.
- Gary Stelling, *Affective Behavior Control for Lifelike Pedagogical Agents*, 2002.
- Brent Daniel, *Student-Sensitive Multimodal Explanation Generation*, 1999.
- Dennis Rodriguez, *Synchronizing Speech, Locomotion, Gestures, and Virtual Cinematography in 3D Learning Environments with Lifelike Pedagogical Agents*, 1999.
- Stuart Towns, *Multimodal Explanation Generation for 3D Learning Environments*, 1999.
- Joel Grégoire, *Interactive Demonstration of Procedural Tasks in 3D Learning Environments with Lifelike Pedagogical Agents*, 1998.
- Colin Leonard, *Interface Architecture for Multi-Dimensional User Support of Information Rich Tasks*, 1997.
- Jennifer Voerman, *Deictic Behavior Control for Believable Animated Pedagogical Agents*, 1997.
- Matthew Dailey, *Intelligent Interfaces and Complex Analysis Tasks: A Knowledge-Based Interface for Biological Sequence Analysis*, 1995.

Publications

Journal Articles

1. P. Horwitz, F. Reichsman, T. Lord, C. Dorsey, E. Wiebe, and J. Lester. If We Build It, Will They Learn? An Analysis of Students' Understanding in an Interactive Game During and After a Research Project. *Technology, Knowledge and Learning*, 28(4), 1825-1839, 2023.

2. H. Bae, C. Feng, K. Glazewski, C. Hmelo-Silver, Y. Chen, B. Mott, S. Lee, and J. Lester. Co-designing a Classroom Orchestration Assistant for Game-based PBL Environments. *TechTrends*, 67, 918-930, 2023.

3. A. Ottenbreit-Leftwich, K. Glazewski, M. Jeon, K. Jantaraweragul, C. Hmelo-Silver, A. Scribner, S. Lee, B. Mott, and J. Lester. Lessons Learned for AI Education with Elementary Students and Teachers. *International Journal of Artificial Intelligence and Education*, 33(2), 267-289, 2023.

4. N. Wang and J. Lester. K-12 Education in the Age of AI: A Call to Action for K-12 AI Literacy. *International Journal of Artificial Intelligence and Education*, 33(2), 228-232, 2023.

5. A. Giovanelli, J. Rowe, M. Taylor, M. Berna, K. Tebb, C. Penilla, M. Pugatch, J. Lester, and E. Ozer. Supporting Adolescent Engagement with Artificial Intelligence-Driven Digital Health Behavior Change Interventions. *Journal of Medical Internet Research*, 25, 2023.

6. M. Wiedbusch, J. Lester, and R. Azevedo. A Multi-Level Growth Modeling Approach to Measuring Learner Attention with Metacognitive Pedagogical Agents. *Metacognition and Learning*, 18, 465-494, 2023.

7. A. Emerson, W. Min, R. Azevedo, and J. Lester. Early Prediction of Student Knowledge in Game-Based Learning with Distributed Representations of Assessment Questions. *British Journal of Educational Technology*, 54(1), 40-57, 2023.

8. K. Park, B. Mott, S. Lee, A. Gupta, K. Jantaraweragul, K. Glazewski, A. Scribner, A. Ottenbreit-Leftwich, C. Hmelo-Silver, and J. Lester. Investigating a Visual Interface for Elementary Students to Formulate AI Planning Tasks. *Journal of Computer Languages*, 73, 2022.

9. E. Cloude, D. Dever, D. Hahs-Vaughn, A. Emerson, R. Azevedo, and J. Lester. Affective Dynamics and Cognition During Game-Based Learning. *IEEE Transactions on Affective Computing*, 13(4), 1705-1717, 2022.

10. A. Saleh, T. Phillips, C. Hmelo-Silver, K. Glazewski, B. Mott, and J. Lester. A Learning Analytics Approach Towards Understanding Collaborative Inquiry in a Problem-Based Learning Environment. *British Journal of Educational Technology*, 53(5), 1321-1342, 2022.

11. R. Spain, J. Rowe, A. Smith, B. Goldberg, R. Pokorny, B. Mott and J. Lester. A Reinforcement Learning Approach to Adaptive Remediation in Online Training. *Journal of Defense Modeling and Simulation*, 19(2), 173-193, 2022.

12. D. Dever, M. Wiedbusch, E. Cloude, J. Lester, and R. Azevedo. Emotions and the Comprehension of Single versus Multiple Texts during Game-based Learning. *Discourse Processes*, 59(1-2), 94-115, 2022.

13. J. Houchins, D. Boulden, J. Lester, B. Mott, K. Boyer, and E. Wiebe. How Use-Modify-Create Brings Middle Grades Students to Computational Thinking. *International Journal of Designs for Learning*, 12(3), 1-20, 2021.

14. R. Spain, C. Penilla, E. Ozer, R. Taylor, C. Ringstaff, and J. Lester. Leveraging Game-Based Learning Technologies to Introduce Adolescents to Health Science Careers During the COVID-19 Pandemic. *Journal of STEM Outreach*, 4(4), 1-11, 2021.

15. E. Cloude, D. Carpenter, R. Azevedo, and J. Lester. Game-based Learning Analytics for Supporting Adolescents' Reflection. *Journal of Learning Analytics*, 8(2), 51-72, 2021.

16. M. Geden, A. Emerson, D. Carpenter, J. Rowe, R. Azevedo, and J. Lester. Predictive Student Modeling in Game-Based Learning Environments with Word Embedding Representations of Reflection. *International Journal of Artificial Intelligence in Education*, 31(1), 1-23, 2021.

17. A. Rachmatullah, F. Reichsman, T. Lord, C. Dorsey, B. Mott, J. Lester, and E. Wiebe. Modeling Secondary Students' Genetics Learning in a Game-Based Environment: Integrating the Expectancy-Value Theory of Achievement Motivation and Flow Theory. *Journal of Science Education and Technology*, 30(4), 511-528, 2021.

18. A. Saleh, Y. Chen, C. Hmelo-Silver, K. Glazewski, B. Mott, and J. Lester. Coordinating Scaffolds for Collaborative Inquiry in a Game-Based Learning Environment. *Journal of Research in Science Teaching*, 57(9), 1490-1518, 2020.

19. K. Loderer, R. Pekrun, and J. Lester. Beyond Cold Technology: A Systematic Review and Meta-analysis on Emotions in Technology-based Learning Environments. *Learning and Instruction*, 70, 2020.

20. A. Rachmatullah, E. Wiebe, D. Boulden, B. Mott, K. Boyer, and J. Lester. Development and Validation of the Computer Science Attitudes Scale for Middle School Students (MG-CS Attitudes). *Computers in Human Behavior Reports*, 2, 2020.

21. E. Ozer, J. Rowe, K. Tebb, M. Berna, C. Penilla, A. Giovanelli, C. Jasik, and J. Lester. Fostering Engagement in Health Behavior Change: Iterative Development of an Interactive Narrative Environment to Enhance Adolescent Preventive Health Services. *Journal of Adolescent Health*, 67(2), Supplement, S34-S44, 2020.

22. J. Rowe and J. Lester. Artificial Intelligence for Personalized Preventative Healthcare. *Journal of Adolescent Health*, 67(2), Supplement, S52-S58, 2020.
    Award: ***Journal of Adolescent Health* – Distinguished Dozen Article** (2020).

23. A. Emerson, E. Cloude, R. Azevedo, and J. Lester. Multimodal Learning Analytics for Game-based Learning. *British Journal of Educational Technology*, 51(5), 1505-1526, 2020.

24. M. Taub, R. Sawyer, A. Smith, J. Rowe, R. Azevedo, and J. Lester. The Agency Effect: The Impact of Student Agency on Learning, Emotions, and Problem-Solving Behaviors in a Game-Based Learning Environment. *Computers & Education*, 147, 2020.

25. W. Min, M. Frankosky, B. Mott, J. Rowe, A. Smith, E. Wiebe, K. Boyer, and J. Lester. DeepStealth: Game-Based Learning Stealth Assessment with Deep Neural Networks. *IEEE Transactions on Learning Technologies*, 13(2), 312-325, 2020.

26. M. Taub, R. Sawyer, J. Lester, and R. Azevedo. The Impact of Contextualized Emotions on Self-Regulated Learning and Scientific Reasoning during Learning with a Game-Based Learning Environment. *International Journal of Artificial Intelligence in Education*, 30(1), 97-120, 2020.

27. A. Rachmatullah, B. Akram, D. Boulden, B. Mott, K. Boyer, J. Lester, and E. Wiebe. Development and Validation of the Middle Grades Computer Science Concept Inventory (MG-CSCI) Assessment. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(5), 2020.

28. A. Saleh, C. Hmelo-Silver, K. Glazewski, B. Mott, Y. Chen, J. Rowe, & J. Lester. Collaborative Inquiry Play: A Design Case to Frame Integration of Collaborative Problem Solving with Story-Centric Games. *Information and Learning Sciences*, 10(9/10), 547-566, 2019.

29. A. Smith, S. Leeman-Munk, A. Shelton, B. Mott, E. Wiebe, and J. Lester. A Multimodal Assessment Framework for Integrating Student Writing and Drawing in Elementary Science Learning. *IEEE Transactions on Learning Technologies*, 12(1), 3-15, 2019.

30. J. DeFalco, J. Rowe, L. Paquette, V. Georgoulas-Sherry, K. Brawner, B. Mott, R. Baker, and J. Lester. Detecting and Addressing Frustration in a Serious Game for Military Training. *International Journal of Artificial Intelligence in Education*, 28(2), 152-193, 2018.

31. M. Taub, R. Azevedo, A. Bradbury, G. Millar, and J. Lester. Using Sequence Mining to Reveal the Efficiency in Scientific Reasoning during STEM Learning with a Game-Based Learning Environment. *Learning and Instruction*, 54, 93-103, 2018.

32. M. Taub, N. Mudrick, R. Azevedo, G. Miller, J. Rowe, and J. Lester. Using Multi-Channel Data with Multi-Level Modeling to Assess In-Game Performance During Gameplay with Crystal Island. *Computers in Human Behavior*, 76, 641-655, 2017.

33. J. Rowe, E. Lobene, B. Mott, and J. Lester. Play in the Museum: Design and Development of a Game-based Learning Exhibit for Informal Science Education. *International Journal of Gaming and Computer-Mediated Simulations*, 9(3), 96-113, 2017.

34. M. Pruden, S. Kerkhoff, H. Spires, and J. Lester. Enhancing Writing Achievement Through a Digital Learning Environment: Case Studies of Three Struggling Adolescent Male Writers. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 33(1), 1-19, 2017.

35. J. Wiggins, J. Grafsgaard, K. Boyer, E. Wiebe, and J. Lester. Do You Think You Can? The Influence of Student Self-Efficacy on the Effectiveness of Tutorial Dialogue for Computer Science. *International Journal of Artificial Intelligence in Education*, 27(1), 130-153, 2017.

36. K. Tebb, R. Erenrich, C. Jasik, M. Berna, J. Lester, and E. Ozer. Use of Theory in Computer-Based Interventions to Reduce Alcohol Use Among Adolescents and Young Adults: A Systematic Review. *BMC Public Health*, 16:517, 2016.

37. A. Shelton, A. Smith, E. Wiebe, C. Behrle, R. Sirkin, and J. Lester. Drawing and Writing in Digital Science Notebooks: Sources of Formative Assessment Data. *Journal of Science Education and Technology*, 23(3), 474-488, 2016.

38. L. Johnson and J. Lester. Face-to-Face Interaction with Pedagogical Agents, Twenty Years Later. *International Journal of Artificial Intelligence in Education*, 26(1), 25-36, 2016.

39. S. Lee, J. Rowe, B. Mott, and J. Lester. A Supervised Learning Framework for Modeling Director Agent Strategies in Educational Interactive Narrative. *IEEE Transactions on Computational Intelligence and AI in Games*, 6(2), 1-13, 2014.

40. J. Sabourin and J. Lester. Affect and Engagement in Game-Based Learning Environments. *IEEE Transactions on Affective Computing*, 5(1), 45-56, 2014.

41. J. Lester, H. Spires, J. Nietfeld, J. Minogue, B. Mott, and E. Lobene. Designing Game-based Learning Environments for Elementary Science Education: A Narrative-centered Learning Perspective. *Information Sciences*, 264, 4-18, 2014.

42. C. Mitchell, E. Ha, K. Boyer, and J. Lester. Learner Characteristics and Dialogue: Recognizing Effective and Student-Adaptive Tutorial Strategies. *International Journal of Learning Technology*, 8(4), 382-403, 2013.

43. J. Sabourin, L. Shores, B. Mott, and J. Lester. Understanding and Predicting Student Self-Regulated Learning Strategies in Game-Based Learning Environments. *International Journal of Artificial Intelligence in Education*, 23(1-4), 94-114, 2013.

44. J. Sabourin, J. Rowe, B. Mott and J. Lester. Considering Alternate Futures to Classify Off-Task Behavior as Emotion Self-Regulation: A Supervised Learning Approach. *Journal of Educational Data Mining*, 5(1), 9-38, 2013.

45. A. Meluso, M. Zheng, H. Spires, and J. Lester. Enhancing 5th Graders' Science Content Knowledge and Self-Efficacy Through Game-based Learning. *Computers & Education*, 59(2), 497-504, 2012.

46. H. Spires, J. Rowe, B. Mott, and J. Lester. Problem Solving and Game-Based Learning: Effects of Middle Grade Students' Hypothesis Testing Strategies on Learning Outcomes. *Journal of Educational Computing Research*, 44(4), 453-472, 2011.

47. J. Rowe, L. Shores, B. Mott, and J. Lester. Integrating Learning, Problem Solving, and Engagement in Narrative-Centered Learning Environments. *International Journal of Artificial Intelligence in Education*, 21(1-2), 115-133, 2011.

48. K. Boyer, R. Phillips, A. Ingram, E. Ha, M. Wallis, M. Vouk, and J. Lester. Investigating the Relationship Between Dialogue Structure and Tutoring Effectiveness: A Hidden Markov Modeling Approach. *International Journal of Artificial Intelligence in Education*, 21(1-2), 65-81, 2011.

49. S. McQuiggan, J. Robison, and J. Lester. Affective Transitions in Narrative-Centered Learning Environments. *Educational Technology & Society*, 13(1), 40-53, 2010.

50. S. McQuiggan and J. Lester. Modeling Affect Expression and Recognition in an Interactive Learning Environment. *International Journal of Learning Technology*, 4(3/4), 216-233, 2009.

51. K. Boyer, R. Phillips, M. Wallis, M. Vouk, and J. Lester. Investigating the Role of Motivation in Computer Science Education through One-on-One Tutoring. *Computer Science Education*, 19(2), 111-136, 2009.

52. S. McQuiggan, B. Mott, and J. Lester. Modeling Self-Efficacy in Intelligent Tutoring Systems: An Inductive Approach. *User Modeling and User-Adapted Interaction*, 18(1-2), 81-123, 2008.

53. S. McQuiggan and J. Lester. Modeling and Evaluating Empathy in Embodied Conversational Agents. *International Journal of Human-Computer Studies*, 65(4), 348-360, 2007.

54. C. Callaway and J. Lester. Narrative Prose Generation. *Artificial Intelligence*, 139(2), 213-252, 2002.

55. R. Moreno, R. Mayer, H. Spires, and J. Lester. The Case for Social Agency in Computer-Based Teaching: Do Students Learn More Deeply When They Interact with Animated Pedagogical Agents? *Cognition and Instruction*, 19(2), 177-213, 2001.

56. L. Johnson, J. Rickel, and J. Lester. Animated Pedagogical Agents: Face-to-Face Interaction in Interactive Learning Environments. *International Journal of Artificial Intelligence in Education*, 11, 47-78, 2000.
    Award: **IFAAMAS Influential Paper Award** (2017).

57. W. Bares and J. Lester. Intelligent Multi-Shot 3D Visualization Interfaces. *Knowledge-Based Systems*, 12(8), 403-412, 1999.

58. J. Lester, S. Towns, and P. FitzGerald. Achieving Affective Impact: Visual Emotive Communication in Lifelike Pedagogical Agents. *International Journal of Artificial Intelligence in Education*, 10(3-4), 278-291, 1999.

59. J. Lester, B. Stone, and G. Stelling. Lifelike Pedagogical Agents for Mixed-Initiative Problem Solving in Constructivist Learning Environments. *User Modeling and User-Adapted Interaction*, 9(1-2), 1-44, 1999.

60. J. Lester, J. Voerman, S. Towns, and C. Callaway. Deictic Believability: Coordinated Gesture, Locomotion, and Speech in Lifelike Pedagogical Agents. *Applied Artificial Intelligence*, 13(4-5), 383-414, 1999.

61. K. Branting, J. Lester, and C. Callaway. Automating Judicial Document Drafting: A Discourse-Based Approach. *Artificial Intelligence and Law*, 6(2-4), 111-149, 1998.

62. J. Lester and B. Porter. Developing and Empirically Evaluating Robust Explanation Generators: The KNIGHT Experiments. *Computational Linguistics*, 23(1), 65-101, 1997.

Book Chapters

1. J. Lester, W. Min, J. Rowe, A. Smith, and R. Spain. The Future of AI-Driven Team Training. In *Design Recommendations for Intelligent Tutoring Systems: Volume 11 – Professional Career Education*, Sinatra, A., Graesser, A., Hu, X., Townsend, L., & Rus, V. (eds), pp. 21-28, U.S. Army Research Laboratory, Orlando, Florida, 2023.

2. J. Lester, A. Gupta, F. Fahid, and J. Pande. Learner Modeling in Intelligent Tutoring Systems SWOT Analysis. In *Design Recommendations for Intelligent Tutoring Systems: Volume 10 – Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis of Intelligent Tutoring Systems*, Sinatra, A.,

Graesser, A., Hu, X., Goodwin, G., & Rus, V. (eds.), pp. 43-51, U.S. Army Research Laboratory, Orlando, Florida, 2023.

3. S. Uttamchandani, H. Bae, C. Feng, K. Glazewski, C. Hmelo-Silver, T. Brush, B. Mott, and J. Lester. Teacher Orchestration Systems Supported by AI: Theoretical Possibilities and Practical Considerations. In *Artificial Intelligence in STEM Education*, Ouyang, F., Jiao, P., McLaren, B., & Alavi, A. (eds.), pp. 151-162, CRC Press, Boca Raton, 2022.

4. J. Lester, R. Spain, J. Rowe, and B. Mott. Instructional Support, Feedback, and Coaching in Game-based Learning. In *Handbook of Game-based Learning*, Plass, J., Mayer, R., & Homer, B. (eds.), pp. 209-237, MIT Press, Cambridge, Massachusetts, 2019.

5. J. Folsom-Kovarik, J. Rowe, K. Brawner, and J. Lester. Toward Automated Scenario Generation with GIFT. In *Design Recommendations for Intelligent Tutoring Systems: Volume 7 – Self-Improving Systems*, Sinatra, A., Graesser, A., Hu, X., Brawner, K., & Rus, V. (eds.), pp. 109-118, U.S. Army Research Laboratory, Orlando, Florida, 2019.

6. E. Ozer, A. Piatt, I. Holsen, T. Larsen, J. Lester, and E. Ozer. Innovative Approaches to Promoting Positive Youth Development in Diverse Contexts: Novel Applications of Participatory Research and New Technologies. In *Positive Youth Development in Global Contexts of Social and Economic Change*, Petersen, A., Koller, S., Motti-Stefanidi, F., & Verma, S. (eds.), pp. 201-221, Routledge / Taylor and Francis Group, New York, 2017.

7. J. Lester, B. Mott, J. Rowe, and R. Taylor. Design Principles for Pedagogical Agent Authoring Tools. In *Design Recommendations for Intelligent Tutoring Systems: Volume 3 – Authoring Tools & Expert Modeling Techniques*, Sottilare, R., Graesser, A., Hu, X., & Brawner, K. (eds.), pp. 151-160, U.S. Army Research Laboratory, Orlando, Florida, 2015.

8. J. Lester, E. Lobene, B. Mott, and J. Rowe. Serious Games with GIFT: Instructional Strategies, Game Design, and Natural Language in the Generalized Intelligent Framework for Tutoring. In *Design Recommendations for Adaptive Intelligent Tutoring Systems: Volume 2 – Instructional Management*, Sottilare, R., Graesser, A., Hu, X., & Goldberg, B. (eds.), pp. 205-215, U.S. Army Research Laboratory, Orlando, Florida, 2014.

9. E. Ha, J. Rowe, B. Mott, and J. Lester. Recognizing Player Goals in Open-Ended Digital Games with Markov Logic Networks. In *Plan, Activity and Intent Recognition: Theory and Practice*, Sukthankar, G., Goldman, R., Geib, C., Pynadath, D., & Bui, H. (eds.), pp. 289-311, Morgan Kauffman, Waltham, Massachusetts, 2014.

10. J. Lester, B. Mott, J. Rowe, and J. Sabourin. Learner Modeling to Predict Real-Time Affect in Serious Games. In *Design Recommendations for Adaptive Intelligent Tutoring Systems: Volume 1 – Learner Modeling*, Sottilare, R., Graesser, A., Hu, X., & Holden, H. (eds.), pp. 201-210, U.S. Army Research Laboratory, Orlando, Florida, 2013.

11. J. Lester, J. Rowe and B. Mott. Narrative-Centered Learning Environments: A Story-Centric Approach to Educational Games. In *Emerging Technologies for the Classroom: A Learning Sciences Perspective*, Mouza, C., & Lavigne, N. (eds.), pp. 223-238, Springer, New York, 2013.

12. J. Lester, B. Mott, J. Robison, J. Rowe and L. Shores. Supporting Self-Regulated Learning in Narrative-Centered Learning Environments. In *International Handbook of Metacognition and Learning Technologies*, Azevedo, R., & Aleven, V. (eds.), pp. 471-483, Springer, New York, 2013.

13. J. Lester, S. McQuiggan, and J. Sabourin. Affect Recognition and Expression in Narrative-Centered Learning Environments. In *New Perspectives on Affect and Learning Technologies*, Calvo, R., & D'Mello, S. (eds.), pp. 85-96, Springer, New York, 2011.

14. J. Lester, K. Branting, and B. Mott. Conversational Agents. In *Practical Handbook of Internet Computing*, Singh, M. (ed.), Chapman Hall & CRC Press, Baton Rouge, 2004.

15. J. Lester, C. Callaway, J. Grégoire, G. Stelling, S. Towns, and L. Zettlemoyer. Animated Pedagogical Agents in Knowledge-Based Learning Environments. In *Smart Machines in Education:*

The Coming Revolution in Educational Technology, Forbus, K., & Feltovich, P. (eds.), pp. 269-298, AAAI/MIT Press, Menlo Park, 2001.

16. J. Lester, S. Towns, C. Callaway, J. Voerman, and P. FitzGerald. Deictic and Emotive Communication in Animated Pedagogical Agents. In *Embodied Conversational Agents*, Cassell, J., Prevost, S., Sullivan, J., & Churchill, E. (eds.), pp. 123-154, MIT Press, Boston, 2000.

17. C. Elliott, J. Rickel, and J. Lester. Lifelike Pedagogical Agents and Affective Computing: An Exploratory Synthesis. In *Artificial Intelligence Today, Lecture Notes In Artificial Intelligence (Subseries of Lecture Notes in Computer Science)*, Wooldridge, M., & Veloso, M. (eds.), pp. 195-212, Springer-Verlag, Berlin, 1999.

18. J. Lester, B. Stone, and G. Stelling. Lifelike Pedagogical Agents for Mixed-Initiative Problem Solving in Constructivist Learning Environments. In *Computational Models of Mixed-Initiative Interaction*, Haller, S., McRoy, S., & Kobsa, A. (eds.), pp.185-228, Kluwer Academic Publishers, Dordrecht, 1999.

19. K. Branting, J. Lester, and C. Callaway. Automating Judicial Document Drafting: A Discourse-Based Approach. In *Judicial Applications of Artificial Intelligence*, Sartor, G. & Branting, K. (eds.), pp. 7-45. Kluwer, 1998.

20. B. Stone and J. Lester. Dynamically Sequencing an Animated Pedagogical Agent. In *Readings in Agents*, Huhns, M. & Singh, M. (eds.), pp. 156-163, Morgan Kaufmann, 1998.

21. P. FitzGerald and J. Lester. Knowledge-Based Learning Environments: A Vision for the 21st Century. *Interactive Technologies and the Social Sciences: Emerging Issues and Applications*, P. Martorella (ed.), pp. 111-127. SUNY Press, New York, 1997.

22. L. Acker, J. Lester, A. Souther, B. Porter. Generating Coherent Explanations to Answer Students' Questions. In *Intelligent Tutoring Systems: Evolutions in Design*, Burns, H., Parlett, J., & Redfield C. (eds.), pp. 151-176. Hillsdale, New Jersey: Lawrence Erlbaum, 1991.

Papers in Conference Proceedings

1. D. Dever, M. Wiedbusch, S. Park, A. Llinas, J. Lester, and R. Azevedo. Assessing the Complexity of Gaming Mechanics During Science Learning. *Proceedings of the Twelfth International Conference on Games and Learning Alliance (GALA-2023)*, pp. 299-308, Dublin, Ireland, 2023.
   Award: **Best Paper Award**

2. S. Paul, R. Spain, W. Min, J. Pande, and J. Lester. Evaluating the Classification Performance of Natural Language Processing-Driven Team Communication Analysis Models. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (HFES-2023)*, pp. 2181-2186, Washington, DC, 2023.

3. A. Zambrano, A. Barany, J. Ocumpaugh, N. Nasiar, S. Hutt, A. Goslen, J. Rowe, J. Lester, E. Wiebe, and B. Mott. Cracking the Code of Learning Gains: Using Ordered Network Analysis to Understand the Influence of Prior Knowledge. *Proceedings of the International Conference on Quantitative Ethnography (ICQE-2023)*, pp. 18-33, Melbourne, Australia, 2023.

4. V. Kumaran, J. Rowe, B. Mott, and J. Lester. SceneCraft: Automating Interactive Narrative Scene Generation in Digital Games with Large Language Models. *Proceedings of the Nineteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2023)*, pp. 86-96, Salt Lake City, Utah, 2023.

5. Y. Kim, A. Goslen, J. Rowe, B. Mott, and J. Lester. Language Model-Based Player Goal Recognition in Open World Digital Games. *Proceedings of the Nineteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2023)*, pp. 75-85, Salt Lake City, Utah, 2023.

6. V. Kumaran, D. Carpenter, J. Rowe, B. Mott, and J. Lester. End-to-End Procedural Level Generation in Educational Games with Natural Language Instruction. *Proceedings of the IEEE Conference on Games (CoG-2023)*, Boston, 2023.

7. S. Lee, B. Mott, J. Vandenberg, H. Spires, and J. Lester. Examining the Relationship of Gameplay and Learning in a Narrative-Centered Digital Game for Science Education. *Proceedings of the IEEE Conference on Games (CoG-2023)*, Boston, 2023.

8. V. Kumaran, J. Rowe, B. Mott, S. Chaturvedi, and J. Lester. Improving Classroom Dialogue Act Recognition from Limited Labeled Data with Self-Supervised Contrastive Learning Classifiers. *Proceedings of the Findings of the Association for Computational Linguistics*, pp. 10978-10992, Toronto, 2023.

9. A. Gupta, D. Carpenter, W. Min, B. Mott, K. Glazewski, C. Hmelo-Silver, and J. Lester. Enhancing Stealth Assessment in Collaborative Game-based Learning with Multi-Task Learning. *Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence in Education (AIED-2023)*, pp. 304-315, Tokyo, 2023.

10. J. Pande, W. Min, R. Spain, J. Saville, and J. Lester. Robust Team Communication Analytics with Transformer-Based Dialogue Modeling. *Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence in Education (AIED-2023)*, pp. 639-650, Tokyo, 2023.

11. A. Goslen, N. Henderson, J. Rowe, J. Zhang, S. Hutt, J. Ocumpaugh, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Enhancing Engagement Modeling in Game-Based Learning Environments with Student-Agent Discourse Analysis. *Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence in Education (AIED-2023)*, pp. 681-687, Tokyo, 2023.

12. N. Nasiar, A. Zambrano, J. Ocumpaugh, S. Hutt, A. Goslen, J. Rowe, J. Lester, N. Henderson, E. Wiebe, K. Boyer, and B. Mott. It's Good to Explore: Investigating Silver Pathways and the Role of Frustration during Game-based Learning. *Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence in Education (AIED-2023)*, pp. 497-503, Tokyo, 2023.

13. S. Chakraburty, M. Jeon, K. Glazewski, C. Hmelo-Silver, A. Ottenbreit-Leftwich, A., K. Jantaraweragul, A. Scribner, B. Mott, and J. Lester. An Analysis of Teacher Practices and Student Participation in Contrasting Activity Systems in an AI Educational Program. *Proceedings of the Seventeenth International Conference of the Learning Sciences (ICLS-2023)*, pp. 1026-1029, Montreal, 2023.

14. T. Wang, S. Uttamchandani, X. Zou, C. Hmelo-Silver, J. Rowe, and J. Lester. Learning with Stories. Characteristics and Learning Outcomes in Narrative-Centered Science Learning Environments. *Proceedings of the Seventeenth International Conference of the Learning Sciences (ICLS-2023)*, pp. 1202-1205, Montreal, 2023.

15. S. Steinberg, C. Hmelo-Silver, X. Zou, J. Danish, and J. Lester. Seeing Student Engagement in Classroom Video: Affordances of Cognitive and Sociocultural Frameworks. *Proceedings of the Sixteenth International Conference on Computer-Supported Collaborative Learning (CSCL-2023)*, pp. 123-130, Montreal, 2023.

16. D. Hong, X. Zou, S. Uttamchandani, T. Wang, C. Hmelo-Silver, K. Glazewski, B. Mott, and J. Lester. Towards Understanding Collaborative Scientific Inquiry Practices in CSCL Classrooms with In-Game Data. *Proceedings of the Sixteenth International Conference on Computer-Supported Collaborative Learning (CSCL-2023)*, pp. 396-397, Montreal, 2023.

17. F. Fahid, S. Lee, B. Mott, J. Vandenberg, H. Acosta, T. Brush, K. Glazewski, C. Hmelo-Silver, and J. Lester. Effects of Modalities in Detecting Behavioral Engagement in Collaborative Game-Based Learning. *Proceedings of the Thirteenth International Learning Analytics & Knowledge Conference (LAK-2023)*, pp. 208-218, Arlington, Texas, 2023.

18. A. Emerson, W. Min, J. Rowe, R. Azevedo, and J. Lester. Multimodal Predictive Student Modeling with Multi-Task Transfer Learning. *Proceedings of the Thirteenth International Learning Analytics & Knowledge Conference (LAK-2023)*, pp. 333-344, Arlington, Texas, 2023.

19. J. Saville, R. Spain, D. Slack, E. Hill, and J. Lester. Evaluating the Usability of a Next-Generation Heads-Up Display for Firefighters in a Virtual Environment. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (HFES-2022),* pp. 1942-1946, Atlanta, Georgia, 2022.

20. A. Gupta, D. Carpenter, W. Min, J. Rowe, R. Azevedo, and J. Lester. Enhancing Multimodal Goal Recognition in Open-World Games with Natural Language Player Reflections. *Proceedings of the Eighteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2022)*, pp. 37-44, Pomona, California, 2022.

21. A. Goslen, D. Carpenter, J. Rowe, R. Azevedo, and J. Lester. Robust Player Plan Recognition in Digital Games with Multi-Task Multi-Label Learning. *Proceedings of the Eighteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2022)*, pp. 105-112, Pomona, California, 2022.

22. K. Park, H. Sohn, W. Min, B. Mott, K. Glazewski, C. Hmelo-Silver, and J. Lester. Disruptive Talk Detection in Multi-Party Dialogue within Collaborative Learning Environments with a Regularized User-Aware Network. *Proceedings of the Twenty-Third Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2022)*, pp. 490-499, Edinburgh, UK, 2022.

23. A. Goslen, D. Carpenter, J. Rowe, N. Henderson, R. Azevedo, and J. Lester. Leveraging Student Goal Setting for Real-Time Plan Recognition in Game-Based Learning. *Proceedings of the Twenty-Third International Conference on Artificial Intelligence in Education (AIED-2022)*, pp. 78-89, Durham, United Kingdom, 2022.

24. J. Zhang, S. Hutt, J. Ocumpaugh, N. Henderson, A. Goslen, J. Rowe, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Investigating Student Interest and Engagement in Game-Based Learning Environments. *Proceedings of the Twenty-Third International Conference on Artificial Intelligence in Education (AIED-2022)*, pp. 711-716, Durham, United Kingdom, 2022.

25. F. Fahid, H. Acosta, S. Lee, D. Carpenter, B. Mott, H. Bae, A. Saleh, T. Brush, K. Glazewski, C. Hmelo-Silver, and J. Lester. Multimodal Behavioral Disengagement Detection for Collaborative Game-based Learning. *Proceedings of the Twenty-Third International Conference on Artificial Intelligence in Education (AIED-2022)*, pp. 218-221, Durham, United Kingdom, 2022.

26. F. Fahid, J. Rowe, R. Spain, B. Goldberg, R. Pokorny, and J. Lester. Robust Adaptive Scaffolding with Inverse Reinforcement Learning-Based Reward Design. *Proceedings of the Twenty-Third International Conference on Artificial Intelligence in Education (AIED-2022)*, pp. 204-207, Durham, United Kingdom, 2022.

27. N. Henderson, H. Acosta, W. Min, B. Mott, T. Lord, F. Reichsman, C. Dorsey, E. Wiebe, and J. Lester. Enhancing Stealth Assessment in Game-Based Learning Environments with Generative Zero-Shot Learning. *Proceedings of the Fifteenth International Conference on Educational Data Mining (EDM-2022)*, pp. 171-182, Durham, United Kingdom, 2022.

28. J. Saville, R. Spain, J. Johnston, and J. Lester. An Analysis of Squad Communication Behaviors during a Field-Training Exercise to Support Tactical Decision Making. *Proceedings of the Thirteenth International Conference on Applied Human Factors and Ergonomics (AHFE-2022)*, pp. 109-116, New York, 2022.

29. N. Henderson, W. Min, J. Rowe and J. Lester. Enhancing Multimodal Affect Recognition with Multi-Task Affective Dynamics Modeling. *Proceedings of the Ninth International Conference on Affective Computing and Intelligent Interaction (ACII-2021)*, pp. 1-8, Virtual, 2021.

30. M. Mott, B. Mott, J. Rowe, E. Ozer, A. Giovanelli, M. Berna, M. Pugatch, K. Tebb, C. Penilla, and J. Lester. "What's important to you, Max?": The Influence of Goals on Engagement in an Interactive Narrative for Adolescent Health Behavior Change. *Proceedings of the Fourteenth International Conference on Interactive Digital Storytelling (ICIDS-2021)*, pp. 379-392, Tallinn, Estonia, 2021.

31. K. Park, B. Mott, S. Lee, K. Glazewski, A. Scribner, A. Ottenbreit-Leftwich, C. Hmelo-Silver, and J. Lester. Designing a Visual Interface for Elementary Students to Formulate AI Planning Tasks. *Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC-2021)*, pp. 1-9, Virtual, 2021.

32. H. Acosta, N. Henderson, J. Rowe, W. Min, J. Minogue, and J. Lester. What's Fair is Fair: Detecting and Mitigating Bias in Multimodal Models of Visitor Attention. *Proceedings of the Twenty-Third*

International Conference on Multimodal Interaction (ICMI-2021), pp. 258-267, Montreal, Canada, 2021.

33. N. Henderson, W. Min, A. Emerson, J. Rowe, S. Lee, J. Minogue, and J. Lester. Early Prediction of Museum Visitor Engagement with Multimodal Adversarial Domain Adaptation. *Proceedings of the Fourteenth International Conference on Educational Data Mining (EDM-2021)*, pp. 93-104, Paris, France, 2021.

34. F. Fahid, J. Rowe, R. Spain, B. Goldberg, R. Pokorny, and J. Lester. Adaptively Scaffolding Cognitive Engagement with Batch Constrained Deep Q-Networks. *Proceedings of the Twenty-Second International Conference on Artificial Intelligence in Education (AIED-2021)*, pp. 113-124, Virtual, 2021.

35. X. Tian, J. Wiggins, F. Fahid, A. Emerson, D. Bounajim, A. Smith, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Modeling Frustration Trajectories and Problem-Solving Behaviors in Adaptive Learning Environments for Introductory Computer Science. *Proceedings of the Twenty-Second International Conference on Artificial Intelligence in Education (AIED-2021)*, pp. 355-360, Virtual, 2021.

36. A. Emerson, N. Henderson, W. Min, J. Rowe, J. Minogue, and J. Lester. Multimodal Trajectory Analysis of Visitor Engagement with Interactive Science Museum Exhibits. *Proceedings of the Twenty-Second International Conference on Artificial Intelligence in Education (AIED-2021)*, pp. 151-155, Virtual, 2021.

37. W. Min, R. Spain, J. Saville, B. Mott, K. Brawner, J. Johnston, and J. Lester. Multidimensional Team Communication Modeling for Adaptive Team Training: A Hybrid Deep Learning and Graphical Modeling Framework. *Proceedings of the Twenty-Second International Conference on Artificial Intelligence in Education (AIED-2021)*, pp. 293-305, Virtual, 2021.

38. J. Saville, R. Spain, J. Johnston, and J. Lester. Exploration of Team Communication Behaviors from a Live Training Event. *Proceedings of the Twelfth International Conference on Applied Human Factors and Ergonomics (AHFE-2021)*, pp. 101-108, Virtual, 2021.

39. D. Boulden, A. Rachmatullah, M. Hinckle, D. Bounajim, B. Mott, K. Boyer, J. Lester, and E. Wiebe. Supporting Students' Computer Science Learning with a Game-based Learning Environment that Integrates a Use-Modify-Create Scaffolding Framework. *Proceedings of the Twenty-Sixth Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE-2021)*, pp. 129-135, Virtual, 2021.

40. F. Fahid, X. Tian, A. Emerson, J. Wiggins, D. Bounajim, A. Smith, E. Wiebe, B. Mott, K. Boyer, and J. Lester. Progression Trajectory-Based Student Modeling for Novice Block-Based Programming. *Proceedings of the Twenty-Ninth ACM Conference on User Modeling, Adaptation and Personalization (UMAP-2021)*, pp. 189-200, Virtual, 2021.

41. A. Saleh, C. Feng, H. Bae, C. Hmelo-Silver, K. Glazewski, S. Lee, B. Mott, and J. Lester. Negotiating Accountability and Epistemic Stances in Middle-School Collaborative Discourse. *Proceedings of the International Conference on Computer-Supported Collaborative Learning (CSCL-2021)*, pp. 197-200, Virtual, 2021.

42. G. Katuka, R. Bex, M. Celepkolu, K. Boyer, E. Wiebe, B. Mott, and J. Lester. My Partner was a Good Partner: Investigating the Relationship between Dialogue Acts and Satisfaction among Middle School Computer Science Learners. *Proceedings of the International Conference on Computer-Supported Collaborative Learning (CSCL-2021)*, pp. 51-58, Virtual, 2021.

43. K. Housh, A. Saleh, T. Phillips, C. Hmelo-Silver, K. Glazewski, S. Lee, B. Mott, and J. Lester. Designing for Equitable Participation in Collaborative Game-Based Learning Environments. *Proceedings of the International Conference on Computer-Supported Collaborative Learning (CSCL-2021)*, pp. 67-74, Virtual, 2021.

44. D. Carpenter, E. Cloude, J. Rowe, R. Azevedo, and J. Lester. Investigating Student Reflection during Game-Based Learning in Middle Grades Science. *Proceedings of the Eleventh International Learning Analytics & Knowledge Conference (LAK-2021)*, pp. 280-291, Virtual, 2021.

45. K. Park, H. Sohn, B. Mott, W. Min, A. Saleh, K. Glazewski, C. Hmelo-Silver, and J. Lester. Detecting Disruptive Talk in Student Chat-Based Discussion within Collaborative Game-Based Learning Environments. *Proceedings of the Eleventh International Learning Analytics & Knowledge Conference (LAK-2021)*, pp. 405-415, Virtual, 2021.

46. J. Wiggins, F. Fahid, A. Emerson, M. Hinckle, A. Smith, K. Boyer, B. Mott, E. Wiebe, and J. Lester. Exploring Novice Programmers' Hint Requests in an Intelligent Block-Based Coding Environment. *Proceedings of the Fifty-Second ACM Technical Symposium on Computer Science Education (SIGCSE-2021)*, pp. 52-58, Virtual, 2021.

47. A. Emerson, N. Henderson, J. Rowe, W. Min, S. Lee, J. Minogue, and J. Lester. Early Prediction of Visitor Engagement in Science Museums with Multimodal Learning Analytics. *Proceedings of the Twenty-Second ACM International Conference on Multimodal Interaction (ICMI-2020),* pp. 107-116, Utrecht, the Netherlands, 2020.

48. N. Henderson, W. Min, J. Rowe, and J. Lester. Enhancing Affect Detection in Game-Based Learning Environments with Multimodal Conditional Generative Modeling. *Proceedings of the Twenty-Second ACM International Conference on Multimodal Interaction (ICMI-2020)*, pp. 134-143, Utrecht, the Netherlands, 2020.

49. W. Min, B. Mott, K. Park, S. Taylor, B. Akram, E. Wiebe, K. Boyer, and J. Lester. Promoting Computer Science Learning with Block-Based Programming and Narrative-Centered Gameplay. *Proceedings of the IEEE Conference on Games (CoG-2020)*, pp. 654-657, Osaka, Japan, 2020.

50. V. Kumaran, B. Mott, and J. Lester. Generating Game Levels for Multiple Distinct Games with a Common Latent Space. *Proceedings of the Sixteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2020)*, pp. 109-115, Worcester, Massachusetts, 2020.

51. N. Henderson, W. Min, J. Rowe, and J. Lester. Multimodal Player Affect Modeling with Auxiliary Classifier Generative Adversarial Networks. *Proceedings of the Sixteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2020)*, pp. 224-230, Worchester, Massachusetts, 2020.

52. D. Bounajim, A. Rachmatullah, D. Boulden, B. Mott, J. Lester, T. Lord, F. Reichsman, P. Horwitz, C. Dorsey, and E. Wiebe. Utilizing Cognitive Load Theory and Evidence-Centered Design to Inform the Design of Game-Based Learning Environments. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (HFES-2020)*, pp. 826-830, Virtual, 2020.

53. R. Spain, J. Saville, B. Liu, D. Slack, E. Hill, J. Holloway, S. Norsworthy, B. Mott, and J. Lester. Investigating a Virtual Reality-Based Emergency Response Scenario and Intelligent User Interface for First Responders. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (HFES-2020)*, pp. 2114-2118, Virtual, 2020.

54. A. Emerson, M. Geden, A. Smith, E. Wiebe, B. Mott, K. Boyer, and J. Lester. Predictive Student Modeling in Block-Based Programming Environments with Bayesian Hierarchical Models. *Proceedings of the Twenty-Eighth ACM Conference on User Modeling, Adaptation and Personalization (UMAP-2020)*, pp. 62-70, Genoa, Italy, 2020.

55. N. Henderson, V. Kumaran, W. Min, B. Mott, Z. Wu, D. Boulden, T. Lord, F. Reichsman, C. Dorsey, E. Wiebe, and J. Lester. Enhancing Student Competency Models for Game-Based Learning with a Hybrid Stealth Assessment Framework. *Proceedings of the Thirteenth International Conference on Educational Data Mining (EDM-2020)*, pp. 92-103, Ifrane, Morocco, 2020.
    Award: **Best Student Paper Award**

56. B. Akram, W. Min, E. Wiebe, A. Navied, B. Mott, K. Boyer, and J. Lester. Automated Assessment of Computer Science Competencies from Student Programs with Gaussian Process Regression. *Proceedings of the Thirteenth International Conference on Educational Data Mining (EDM-2020)*, pp. 555-560, Ifrane, Morocco, 2020.

57. D. Carpenter, A. Emerson, B. Mott, A. Saleh, K. Glazewski, C. Hmelo-Silver, and J. Lester. Detecting Off-Task Behavior from Student Dialogue in Game-Based Collaborative Learning.

Proceedings of the Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020), pp. 56-66, Ifrane, Morocco, 2020.

58. D. Carpenter, M. Geden, J. Rowe, R. Azevedo, and J. Lester. Automated Analysis of Middle School Students' Written Reflections During Game-Based Learning. *Proceedings of the Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020)*, pp. 67-78, Ifrane, Morocco, 2020.

59. A. Emerson, N. Henderson, J. Rowe, W. Min, S. Lee, J. Minogue, and J. Lester. Investigating Visitor Engagement in Interactive Science Museum Exhibits with Multimodal Bayesian Hierarchical Models. *Proceedings of the Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020)*, pp. 165-176, Ifrane, Morocco, 2020.

60. N. Henderson, J. Rowe, L. Paquette, R. Baker, and J. Lester. Improving Affect Detection in Game-Based Learning with Multimodal Data Fusion. *Proceedings of the Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020)*, pp. 228-239, Ifrane, Morocco, 2020.

61. K. Park, B. Mott, W. Min, E. Wiebe, K. Boyer, and J. Lester. Generating Game Levels to Develop Computer Science Competencies in Game-Based Learning Environments. *Proceedings of the Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020)*, pp. 240-245, Ifrane, Morocco, 2020.

62. H. Bae, A. Saleh, C. Feng, K. Glazewski, C. Hmelo-Silver, Y. Chen, A. Scribner, T. Brush, B. Mott, S. Lee, and J. Lester. Designing Intelligent Cognitive Assistants with Teachers to Support Classroom Orchestration of Collaborative Inquiry. *Proceedings of the International Conference of the Learning Sciences (ICLS-2020)*, pp. 2101-2108, Nashville, 2020.

63. Y.Chen, A. Saleh, C. Hmelo-Silver, K. Glazewski, B. Mott, and J. Lester. Supporting Collaboration: From Learning Analytics to Teacher Dashboards. *Proceedings of the International Conference of the Learning Sciences (ICLS-2020)*, pp. 1689-1692, Nashville, 2020.

64. M. Hinckle, A. Rachmatullah, B. Mott, K. Boyer, J. Lester, and E. Wiebe. The Relationship of Gender, Experiential, and Psychological Factors to Achievement in Computer Science. *Proceedings of the ACM Conference on Innovation and Technology in Computer Science Education (ITiCSE-2020)*, pp. 225-231, Trondheim, Norway, 2020.

65. M. Celepkolu, D. Fussell, A. Galdo, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Exploring Middle School Students' Reflections on the Infusion of CS into Science Classrooms. *Proceedings of the Fifty-First ACM Technical Symposium on Computer Science Education (SIGCSE-2020)*, pp. 671-677, Portland, 2020.

66. A. Emerson, A. Smith, F. Rodríguez, E. Wiebe, B. Mott, K. Boyer, and J. Lester. Cluster-Based Analysis of Novice Coding Misconceptions in Block-Based Programming. *Proceedings of the Fifty-First ACM Technical Symposium on Computer Science Education (SIGCSE-2020)*, pp. 825-831, Portland, 2020.

67. M. Geden, A. Emerson, J. Rowe, R. Azevedo, and J. Lester. Predictive Student Modeling in Educational Games with Multi-Task Learning. *Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI-2020)*, pp. 654-661, New York, 2020.

68. B. Mott, R. Taylor, S. Lee, J. Rowe, A. Saleh, K. Glazewski, C. Hmelo-Silver, and J. Lester. Designing and Developing Interactive Narratives for Collaborative Problem-Based Learning. *Proceedings of the Twelfth International Conference on Interactive Digital Storytelling (ICIDS-2019)*, pp. 86-100, Snowbird, Utah, 2019.

69. N. Henderson, A. Emerson, J. Rowe, and J. Lester. Improving Sensor-Based Affect Detection with Multimodal Data Imputation. *Proceedings of the Eighth International Conference on Affective Computing and Intelligent Interaction (ACII-2019)*, pp. 669-675, Cambridge, England, 2019.

70. K. Park, B. Mott, W. Min, K. Boyer, E. Wiebe, and J. Lester. Generating Educational Game Levels with Multistep Deep Convolutional Generative Adversarial Networks. *Proceedings of the IEEE Conference on Games (COG-2019)*, pp. 345-352 London, 2019.

71. A. Emerson, A. Smith, C. Smith, F. Rodríguez, W. Min, E. Wiebe, B. Mott, K. Boyer, and J. Lester. Predicting Early and Often: Predictive Student Modeling for Block-Based Programming Environments. *Proceedings of the Twelfth International Conference on Educational Data Mining (EDM-2019)*, pp. 39-48, Montreal, 2019.

72. N. Henderson, J. Rowe, B. Mott, K. Brawner, R. Baker, and J. Lester. 4D Affect Detection: Improving Frustration Detection in Game-Based Learning with Posture-Based Temporal Data Fusion. *Proceedings of the Twentieth International Conference on Artificial Intelligence in Education (AIED-2019)*, pp. 144-156, Chicago, 2019.

73. W. Min, K. Park, J. Wiggins, B. Mott, E. Wiebe, K. Boyer, and J. Lester. Predicting Dialogue Breakdown in Conversational Pedagogical Agents with Multimodal LSTMs. *Proceedings of the Twentieth International Conference on Artificial Intelligence in Education (AIED-2019)*, pp. 195-200, Chicago, 2019.

74. J. Wiggins, M. Kulkarni, W. Min, K. Boyer, B. Mott, E. Wiebe, and J. Lester. Take the Initiative: Mixed Initiative Dialogue Policies for Pedagogical Agents in Game-Based Learning Environments. *Proceedings of the Twentieth International Conference on Artificial Intelligence in Education (AIED-2019)*, pp. 314-318, Chicago, 2019.

75. E. Cloude, M. Taub, J. Lester, and R. Azevedo. The Role of Goal Achievement Orientation on Metacognitive Process Use in Game-based Learning. *Proceedings of the Twentieth International Conference on Artificial Intelligence in Education (AIED-2019)*, pp. 36-40, Chicago, 2019.

76. E. Wiebe, J. London, O. Aksit, B. Mott, K. Boyer, and J. Lester. Development of a Lean Computational Thinking Abilities Assessment for Middle Grades Students. *Proceedings of the Fiftieth ACM Technical Symposium on Computer Science Education (SIGCSE-2019)*, pp. 456-461, Minneapolis, 2019.

77. R. Sawyer, J. Rowe, R. Azevedo, and J. Lester. Modeling Player Engagement with Bayesian Hierarchical Models. *Proceedings of the Fourteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2018)*, pp. 215-221, Edmonton, Canada, 2018.

78. J. Wiggins, M. Kulkarni, W. Min, B. Mott, K. Boyer, E. Wiebe, and J. Lester. Affect-based Early Prediction of Player Mental Demand and Engagement for Educational Games. *Proceedings of the Fourteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2018)*, pp. 243-249, Edmonton, Canada, 2018.

79. P. Wang, J. Rowe, W. Min, B. Mott, and J. Lester. High-Fidelity Simulated Players for Interactive Narrative Planning. *Proceedings of the Twenty-Seventh International Joint Conference on Artificial Intelligence (IJCAI-2018)*, pp. 3884-3890, Stockholm, Sweden, 2018.

80. B. Akram, W. Min, E. Wiebe, B. Mott, K. Boyer, and J. Lester. Improving Stealth Assessment in Game-based Learning with LSTM-based Analytics. *Proceedings of the Eleventh International Conference on Educational Data Mining (EDM-2018)*, pp. 208-218, Buffalo, New York, 2018.

81. R. Sawyer, J. Rowe, R. Azevedo, and J. Lester. Filtered Time Series Analyses of Student Problem-Solving Behaviors in Game-based Learning. *Proceedings of the Eleventh International Conference on Educational Data Mining (EDM-2018)*, pp. 229-238, Buffalo, New York, 2018.

82. A. Emerson, R. Sawyer, R. Azevedo, and J. Lester. Gaze-Enhanced Student Modeling for Game-based Learning. *Proceedings of the Twenty-Sixth ACM Conference on User Modeling, Adaptation and Personalization (UMAP-2018)*, pp. 63-72, Singapore, 2018.

83. R. Sawyer, N. Mudrick, R. Azevedo, and J. Lester. Impact of Learner-Centered Affective Dynamics on Metacognitive Judgements and Performance in Advanced Learning Technologies. *Proceedings of the Nineteenth International Conference on Artificial Intelligence in Education (AIED-2018)*, pp. 312-316, London, 2018.

84. A. Saleh, K. Shanahan, Y. Chen, C. Hmelo-Silver, J. Rowe, and J. Lester. Scaffolding Peer Facilitation in Computer-Supported Problem-based Learning Environments. *Proceedings of the Thirteenth International Conference of the Learning Sciences (ICLS-2018)*, pp. 1831-1834, London, 2018.

85. N. Mudrick, R. Sawyer, M. Price, J. Lester, C. Roberts, and R. Azevedo. Identifying How Metacognitive Judgments Influence Student Performance During Learning with MetaTutorIVH. *Proceedings of the Fourteenth International Conference on Intelligent Tutoring Systems (ITS-2018)*, pp. 140-149, Montreal, Canada, 2018.

86. P. Buffum, K. Ying, X. Zheng, K. Boyer, E. Wiebe, B. Mott, D. Blackburn, and J. Lester. Introducing the Computer Science Concept of Variables in Middle School Science Classrooms. *Proceedings of the Forty-Ninth ACM Technical Symposium on Computer Science Education (SIGCSE-2018)*, pp. 906-911, Baltimore, Maryland, 2018.

87. N. Mudrick, M. Taub, R. Azevedo, J. Rowe, and J. Lester. Toward Affect-Sensitive Virtual Human Tutors: The Influence of Facial Expressions on Learning and Emotion. *Proceedings of the Seventh Conference on Affective Computing and Intelligent Interaction (ACII-2017)*, pp. 184-189, San Antonio, Texas, 2017.

88. W. Min, B. Mott, J. Rowe, R. Taylor, E. Wiebe, K. Boyer, and J. Lester. Multimodal Goal Recognition in Open-World Digital Games. *Proceedings of the Thirteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2017)*, pp. 80-86, Snowbird, Utah, 2017.

89. P. Wang, J. Rowe, W. Min, Bradford Mott, and J. Lester. Simulating Player Behavior for Data-Driven Interactive Narrative Personalization. *Proceedings of the Thirteenth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2017)*, pp. 255-261, Snowbird, Utah, 2017.

90. P. Wang, J. Rowe, W. Min, B. Mott, and J. Lester. Interactive Narrative Personalization with Deep Reinforcement Learning. *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence (IJCAI-2017)*, pp. 3852-3858, Melbourne, Australia, 2017.

91. R. Sawyer, A. Smith, J. Rowe, R. Azevedo, and J. Lester. Enhancing Student Models in Game-based Learning with Facial Expression Recognition. *Proceedings of the Twenty-Fifth Conference on User Modeling, Adaptation, and Personalization (UMAP-2017)*, pp. 192-201, Bratislava, Slovakia, 2017.

92. W. Min, M. Frankosky, B. Mott, E. Wiebe, K. Boyer, and J. Lester. Inducing Stealth Assessors from Game Interaction Data. *Proceedings of the Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017)*, pp. 212-223, Wuhan, China, 2017.

93. J. Ocumpaugh, J. Andres, R. Baker, J. DeFalco, L. Paquette, J. Rowe, B. Mott, J. Lester, V. Georgoulas, K. Brawner, and R. Sottilare. Affect Dynamics in Military Trainees using vMedic: From Engaged Concentration to Boredom to Confusion. *Proceedings of the Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017)*, pp. 238-249, Wuhan, China, 2017.

94. R. Sawyer, A. Smith, J. Rowe, R. Azevedo, and J. Lester. Is More Agency Better? The Impact of Student Agency on Game-Based Learning. *Proceedings of the Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017)*, pp. 335-346, Wuhan, China, 2017.

95. R. Sawyer, J. Rowe, and J. Lester. Balancing Learning and Engagement in Game-Based Learning Environments with Multi-Objective Reinforcement Learning. *Proceedings of the Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017)*, pp. 323-334, Wuhan, China, 2017.

96. L. Pezzullo, J. Wiggins, M. Frankosky, W. Min, K. Boyer, B. Mott, E. Wiebe, and J. Lester. "Thanks Alisha, Keep in Touch": Gender Effects and Engagement with Virtual Learning Companions. *Proceedings of the Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017)*, pp. 299-310, Wuhan, China, 2017.

97. P. Wang, J. Row, B. Mott, and J. Lester. Decomposing Drama Management in Educational Interactive Narrative: A Modular Reinforcement Learning Approach. *Proceedings of the Ninth International Conference on Interactive Digital Storytelling (ICIDS-2016)*, pp. 270-282, Los Angeles, California, 2016.

98. W. Min, A. Baikadi, B. Mott, J. Rowe, B. Liu, E. Ha, and J. Lester. A Generalized Multidimensional Evaluation Framework for Player Goal Recognition. *Proceedings of the Twelfth Annual AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2016)*, pp. 197-203, Burlingame, California, 2016.

99. A. Vail, J. Grafsgaard, K. Boyer, E. Wiebe, and J. Lester. Gender Differences in Facial Expressions of Affect During Learning. *Proceedings of the Twenty-Fourth Conference on User Modeling, Adaptation, and Personalization (UMAP-2016)*, pp. 65-73, Halifax, 2016.

100. W. Min, B. Mott, J. Rowe, B. Liu, and J. Lester. Player Goal Recognition in Open-World Digital Games with Long Short-Term Memory Networks. *Proceedings of the Twenty-Fifth International Joint Conference on Artificial Intelligence (IJCAI-2016)*, pp. 2590-2596, New York, 2016.

101. W. Min, J. Wiggins, L. Pezzullo, A. Vail, K. Boyer, B. Mott, M. Frankosky, E. Wiebe, and J. Lester. Predicting Dialogue Acts for Intelligent Virtual Agents with Multimodal Student Interaction Data. *Proceedings of the Ninth International Conference on Educational Data Mining (EDM-2016)*, pp. 454-459, Raleigh, North Carolina, 2016.

102. A. Vail, J. Wiggins, J. Grafsgaard, K. Boyer, E. Wiebe, and J. Lester. The Affective Impact of Tutor Questions: Predicting Frustration and Engagement. *Proceedings of the Ninth International Conference on Educational Data Mining (EDM-2016)*, pp. 247-254, Raleigh, North Carolina, 2016.

103. P. Buffum, M. Frankosky, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Mining Sequences of Gameplay for Embedded Assessment in Collaborative Learning. *Proceedings of the Ninth International Conference on Educational Data Mining (EDM-2016)*, pp. 575-576, Raleigh, North Carolina, 2016.

104. M. Taub, N. Mudrick, R. Azevedo, G. Millar, J. Rowe, and J. Lester. Using Multi-Level Modeling with Eye-Tracking Data to Predict Metacognitive Monitoring and Self-Regulated Learning with Crystal Island. *Proceedings of the Thirteenth International Conference on Intelligent Tutoring Systems (ITS-2016)*, pp. 240-246, Zagreb, Croatia, 2016.

105. A. Vail, J. Grafsgaard, K. Boyer, E. Wiebe, and J. Lester. Predicting Learning from Student Affective Response to Tutor Questions. *Proceedings of the Thirteenth International Conference on Intelligent Tutoring Systems (ITS-2016)*, pp. 154-164, Zagreb, Croatia, 2016.

106. A. Smith, O. Aksit, W. Min, E. Wiebe, B. Mott, and J. Lester. Integrating Real-Time Drawing and Writing Diagnostic Models: An Evidence-Centered Design Framework for Multimodal Science Assessment. *Proceedings of the Thirteenth International Conference on Intelligent Tutoring Systems (ITS-2016)*, pp. 165-175, Zagreb, Croatia, 2016.

107. P. Buffum, M. Frankosky, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Empowering All Students: Closing the CS Confidence Gap with an In-School Initiative for Middle School Students. *Proceedings of the Forty-Seventh ACM Technical Symposium on Computer Science Education (SIGCSE-2016)*, pp. 382-387, Memphis, Tennessee, 2016.

108. P. Buffum, M. Frankosky, K. Boyer, E. Wiebe, B. Mott, J. Lester. Leveraging Collaboration to Improve Gender Equity in a Game-based Learning Environment for Middle School Computer Science. *Proceedings of the First Annual Conference on Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT-2015)*, pp. 1-8, Charlotte, North Carolina, 2015.

109. A. Smith, W. Min, B. Mott, and J. Lester. Diagrammatic Student Models: Modeling Student Drawing Performance with Deep Learning. *Proceedings of the Twenty-Third Conference on User Modeling, Adaptation, and Personalization (UMAP-2015)*, pp. 265-276, Dublin, Ireland, 2015.

110. A. Vail, K. Boyer, E. Wiebe, and J. Lester. The Mars and Venus Effect: The Influence of User Gender on the Effectiveness of Adaptive Task Support. *Proceedings of the Twenty-Third Conference on User Modeling, Adaptation, and Personalization (UMAP-2015)*, pp. 216-227, Dublin, Ireland, 2015.

    Award: **Best Paper Award**.

111. L. Paquette, J. Rowe, R. Baker, B. Mott, J. Lester, J. DeFalco, K. Brawner, R. Sottilare, and V. Georgoulas. Sensor-Free or Sensor-Full: A Comparison of Data Modalities in Multi-Channel Affect Detection. *Proceedings of the Eighth International Conference on Educational Data Mining (EDM-2015)*, pp. 93-100, Madrid, Spain, 2015.

112. P. Buffum, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Mind the Gap: Improving Gender Equity in Game-Based Learning Environments with Learning Companions. *Proceedings of the Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015)*, pp. 64-73, Madrid, Spain, 2015.

113. J. Grafsgaard, S. Lee, B. Mott, K. Boyer, and J. Lester. Modeling Self-Efficacy Across Age Groups with Automatically Tracked Facial Expression. *Proceedings of the Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015)*, pp. 582-585, Madrid, Spain, 2015.

114. S. Leeman-Munk, A. Smith, B. Mott, E. Wiebe, and J. Lester. Two Modes are Better Than One: A Multimodal Assessment Framework Integrating Student Writing and Drawing. *Proceedings of the Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015)*, pp. 205-214, Madrid, Spain, 2015.

115. W. Min, M. Frankosky, B. Mott, J. Rowe, E. Wiebe, K. Boyer, and J. Lester. DeepStealth: Leveraging Deep Learning Models for Stealth Assessment in Game-based Learning Environments. *Proceedings of the Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015)*, pp. 277-286, Madrid, Spain, 2015.

116. J. Rowe and J. Lester. Improving Student Problem Solving in Narrative-Centered Learning Environments: A Modular Reinforcement Learning Framework. *Proceedings of the Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015)*, pp. 419-428, Madrid, Spain, 2015.

117. A. Ezen, J. Grafsgaard, J. Lester, and K. Boyer. Classifying Student Dialogue Acts with Multimodal Learning Analytics. *Proceedings of the Fifth International Learning Analytics & Knowledge Conference (LAK-2015)*, pp. 280-289, Poughkeepsie, New York, 2015.

118. P. Buffum, E. Lobene, M. Frankosky, K. Boyer, E. Wiebe, and J. Lester. A Practical Guide to Developing and Validating Computer Science Knowledge Assessments with Application to Middle School. *Proceedings of the Forty-Sixth ACM Technical Symposium on Computer Science Education (SIGCSE-2015)*, pp. 622-627, Kansas City, Missouri, 2015.

119. J. Grafsgaard, J. Wiggins, A. Vail, K. Boyer, E. Wiebe, and J. Lester. The Additive Value of Multimodal Features for Predicting Engagement, Frustration, and Learning during Tutoring. *Proceedings of the Sixteenth ACM International Conference on Multimodal Interaction (ICMI-2014)*, pp. 42-49, Istanbul, Turkey, 2014.

120. A. Vail, J. Grafsgaard, J. Wiggins, J. Lester, and K. Boyer. Predicting Learning and Engagement in Tutorial Dialogue: A Personality-Based Model. *Proceedings of the Sixteenth ACM International Conference on Multimodal Interaction (ICMI-2014)*, pp. 255-262, Istanbul, Turkey, 2014.

121. W. Min, E. Ha, J. Rowe, B. Mott, and J. Lester. Deep Learning-Based Goal Recognition in Open-Ended Digital Games. *Proceedings of the Tenth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2014)*, pp. 37-43, Raleigh, North Carolina, 2014.

122. J. Rowe, B. Mott, and J. Lester. Optimizing Player Experience in Interactive Narrative Planning: A Modular Reinforcement Learning Approach. *Proceedings of the Tenth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2014)*, pp. 160-166, Raleigh, North Carolina, 2014.

123. A. Baikadi, J. Rowe, B. Mott, and J. Lester. Generalizability of Goal Recognition Models in Narrative-Centered Learning Environments. *Proceedings of the Twenty-Second Conference on User Modeling, Adaptation and Personalization (UMAP-2014)*, pp. 278-289, Aalborg, Denmark, 2014.

124. J. Grafsgaard, J. Wiggins, K. Boyer, E. Wiebe, and J. Lester. Predicting Learning and Affect from Multimodal Data Streams in Task-Oriented Tutorial Dialogue. *Proceedings of the Seventh International Conference on Educational Data Mining (EDM-2014)*, pp. 122-129, London, 2014.

125. A. Smith, E. Wiebe, B. Mott, and J. Lester. SketchMiner: Mining Learner-Generated Science Drawings with Topological Abstraction. *Proceedings of the Seventh International Conference on Educational Data Mining (EDM-2014)*, pp. 288-291, London, 2014.

126. J. Rowe, E. Lobene, B. Mott, and J. Lester. Serious Games Go Informal: A Museum-Centric Perspective on Intelligent Game-Based Learning. *Proceedings of the Twelfth International Conference on Intelligent Tutoring Systems (ITS-2014)*, pp. 410-415, Honolulu, Hawaii, 2014.

127. W. Min, B. Mott, J. Rowe, and J. Lester. Leveraging Semi-Supervised Learning to Predict Student Problem-Solving Performance in Narrative-Centered Learning Environments. *Proceedings of the Twelfth International Conference on Intelligent Tutoring Systems (ITS-2014)*, pp. 664-665, Honolulu, Hawaii, 2014.

128. B. Mott, J. Rowe, W. Min, R. Taylor, and J. Lester. Flare: An Open Source Toolkit for Creating Expressive User Interfaces for Serious Games. *Proceedings of the Ninth International Conference on the Foundations of Digital Games (FDG-2014)*, Fort Lauderdale, Florida, 2014.

129. J. Rowe, E. Lobene, B. Mott, and J. Lester. Play in the Museum: Designing Game-Based Learning Environments for Informal Education Settings. *Proceedings of the Ninth International Conference on the Foundations of Digital Games (FDG-2014)*, Fort Lauderdale, Florida, 2014.

130. S. Leeman-Munk, E. Wiebe, and J. Lester. Assessing Elementary Students' Science Competency with Text Analytics. *Proceedings of the Fourth International Learning Analytics & Knowledge Conference (LAK-2014)*, pp. 143-147, Indianapolis, Indiana, 2014.

131. E. Ha, C. Mitchell, K. Boyer, and J. Lester. Learning Dialogue Management Models for Task-Oriented Dialogue with Parallel Dialogue and Task Streams. *Proceedings of the Fourteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2013)*, pp. 204-213, Metz, France, 2013.

132. C. Mitchell, K. Boyer, and J. Lester. Evaluating State Representations for Reinforcement Learning of Turn-Taking Policies in Tutorial Dialogue. *Proceedings of the Fourteenth Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2013)*, pp. 339-343, Metz, France, 2013.

133. J. Grafsgaard, J. Wiggins, K. Boyer, E. Wiebe, and J. Lester. Automatically Recognizing Facial Indicators of Frustration: A Learning-Centric Analysis. *Proceedings of the Fifth International Conference on Affective Computing and Intelligent Interaction (ACII-2013)*, pp. 159-165, Geneva, Switzerland, 2013.

134. J. Sabourin, B. Mott, and J. Lester. Discovering Behavior Patterns of Self-Regulated Learners in an Inquiry-Based Learning Environment. *Proceedings of the Sixteenth International Conference on Artificial Intelligence in Education (AIED-2013)*, pp. 209-218, Memphis, Tennessee, 2013.

135. W. Min, J. Rowe, B. Mott, and J. Lester. Personalizing Embedded Assessment Sequences in Narrative-Centered Learning Environments: A Collaborative Filtering Approach. *Proceedings of the Sixteenth International Conference on Artificial Intelligence in Education (AIED-2013)*, pp. 369-378, Memphis, Tennessee, 2013.

136. J. Grafsgaard, J. Wiggins, K. Boyer, E. Wiebe, and J. Lester. Embodied Affect in Tutorial Dialogue: Student Gesture and Posture. *Proceedings of the Sixteenth International Conference on Artificial Intelligence in Education (AIED-2013)*, pp. 1-10, Memphis, Tennessee, 2013.

137. C. Mitchell, K. Boyer, and J. Lester. A Markov Decision Process Model of Tutorial Intervention in Task-Oriented Dialogue. *Proceedings of the Sixteenth International Conference on Artificial Intelligence in Education (AIED-2013)*, pp. 828-831, Memphis, Tennessee, 2013.

138. J. Grafsgaard, J. Wiggins, K. Boyer, E. Wiebe, and J. Lester. Automatically Recognizing Facial Expression: Predicting Engagement and Frustration. *Proceedings of the Sixth International Conference on Educational Data Mining (EDM-2013)*, pp. 43-50, Memphis, Tennessee, 2013.

139. J. Sabourin, B. Mott, and J. Lester. Utilizing Dynamic Bayes Nets to Improve Early Prediction Models of Self-Regulated Learning. *Proceedings of the Twenty-First Conference on User Modeling, Adaptation and Personalization (UMAP-2013)*, pp. 228-241, Rome, 2013.
    Award: **James Chen Best Student Paper Award**.

140. J. Grafsgaard, R. Fulton, K. Boyer, E. Wiebe, and J. Lester. Multimodal Analysis of the Implicit Affective Channel in Computer-Mediated Textual Communication. *Proceedings of the Fourteenth ACM International Conference on Multimodal Interaction (ICMI-2012)*, pp. 145-152, Santa Monica, California, 2012.

141. E. Ha, J. Rowe, B. Mott, and J. Lester. Goal Recognition with Markov Logic Networks for Player-Adaptive Games. *Proceedings of the Twenty-Sixth AAAI Conference on Artificial Intelligence (AAAI-2012)*, Canada, pp. 2113-2119, Toronto, 2012.

142. E. Ha, J. Grafsgaard, C. Mitchell, K. Boyer, and J. Lester. Combining Verbal and Nonverbal Features to Overcome the 'Information Gap' in Task-Oriented Dialogue. *Proceedings of the Thirteenth Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2012)*, pp. 247-256, Seoul, South Korea, 2012.

143. C. Mitchell, K. Boyer, and J. Lester. From Strangers to Partners: Examining Convergence within a Longitudinal Study of Task-Oriented Dialogue. *Proceedings of the Thirteenth Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2012)*, pp. 94-98, Seoul, South Korea, 2012.

144. J. Sabourin, B. Mott, and J. Lester. Early Prediction of Student Self-Regulation Strategies by Combining Multiple Models. *Proceedings of the Fifth International Conference on Educational Data Mining (EDM-2012)*, pp. 156-159, Crete, Greece, 2012.

145. J. Sabourin, L. Shores, B. Mott, and J. Lester. Predicting Student Self-Regulation Strategies in Game-Based Learning Environments. *Proceedings of the Eleventh International Conference on Intelligent Tutoring Systems (ITS-2012)*, pp. 141-150, Crete, Greece, 2012.

146. J. Sabourin, J. Rowe, B. Mott, and J. Lester. Exploring Inquiry-based Problem-Solving Strategies in Game-based Learning Environments. *Proceedings of the Eleventh International Conference on Intelligent Tutoring Systems (ITS-2012)*, pp. 470-475, Crete, Greece, 2012.

147. L. Shores, K. Hoffmann, J. Nietfeld, and J. Lester. The Role of Sub-Problems: Supporting Problem Solving in Narrative-Centered Learning Environments. *Proceedings of the Eleventh International Conference on Intelligent Tutoring Systems (ITS-2012)*, pp. 464-469, Crete, Greece, 2012.

148. S. Lee, B. Mott, and J. Lester. Real-Time Narrative-Centered Tutorial Planning for Story-Based Learning. *Proceedings of the Eleventh International Conference on Intelligent Tutoring Systems (ITS-2012)*, pp. 476-481, Crete, Greece, 2012.

149. J. Grafsgaard, K. Boyer, and J. Lester. Toward a Machine Learning Framework for Understanding Affective Tutorial Interaction. *Proceedings of the Eleventh International Conference on Intelligent Tutoring Systems (ITS-2012)*, pp. 52-58, Crete, Greece, 2012.

150. S. Lee, B. Mott, and J. Lester. Director Agent Intervention Strategies for Interactive Narrative Environments. *Proceedings of the Fourth International Conference on Interactive Digital Storytelling (ICIDS-2011)*, Vancouver, Canada, pp. 140-151, 2011.

151. E. Ha, J. Rowe, B. Mott, and J. Lester. Goal Recognition with Markov Logic Networks for Player-Adaptive Games. *Proceedings of the Seventh International Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2011)*, Palo Alto, California, pp. 32-39, 2011.
    Award: **Best Paper Award.**

152. J. Sabourin, B. Mott, and J. Lester. Modeling Learner Affect with Theoretically Grounded Dynamic Bayesian Networks. *Proceedings of the Fourth International Conference on Affective Computing and Intelligent Interaction (ACII-2011)*, Memphis, Tennessee, pp. 286-295, 2011.

153. J. Grafsgaard, K. Boyer, and J. Lester. Predicting Facial Indicators of Confusion with Hidden Markov Models. *Proceedings of the Fourth International Conference on Affective Computing and Intelligent Interaction (ACII-2011)*, Memphis, Tennessee, pp. 97-106, 2011.

154. K. Boyer, E. Ha, R. Phillips, and J. Lester. The Impact of Task-Oriented Feature Sets on HMMs for Dialogue Modeling. *Proceedings of the Twelfth Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2011)*, pp. 49-58, Portland, Oregon, 2011.

155. L. Shores, J. Rowe, and J. Lester. Early Prediction of Cognitive Tool Use in Narrative-Centered Learning Environments. *Proceedings of the Fifteenth International Conference on Artificial Intelligence in Education (AIED-2010)*, pp. 320-327, Auckland, New Zealand, 2011.

156. J. Grafsgaard, K. Boyer, R. Phillips, and J. Lester. Modeling Confusion: Facial Expression, Task, and Discourse in Task-Oriented Tutorial Dialogue. *Proceedings of the Fifteenth International Conference on Artificial Intelligence in Education (AIED-2010)*, pp. 98-105, Auckland, New Zealand, 2011.

157. S. Lee, B. Mott, and J. Lester. Modeling Narrative-Centered Tutorial Decision Making in Guided Discovery Learning. *Proceedings of the Fifteenth International Conference on Artificial Intelligence in Education (AIED-2010)*, pp. 163-170, Auckland, New Zealand, 2011.

158. J. Sabourin, J. Rowe, B. Mott, and J. Lester. When Off-Task is On-Task: The Affective Role of Off-Task Behavior in Narrative-Centered Learning Environments. *Proceedings of the Fifteenth International Conference on Artificial Intelligence in Education (AIED-2010)*, pp. 534-536, Auckland, New Zealand, 2011.

159. K. Boyer, J. Grafsgaard, E. Ha, R. Phillips, and J. Lester. An Affect-Enriched Dialogue Act Classification Model for Task-Oriented Dialogue. *Proceedings of the Forty-Ninth Annual Meeting of the Association for Computational Linguistics: Human Language Technologies (ACL-HLT-2011)*, pp. 1190-1199, Portland, Oregon, 2011.

160. J. Rowe and J. Lester. Modeling User Knowledge with Dynamic Bayesian Networks in Interactive Narrative Environments. *Proceedings of the Sixth Annual AI and Interactive Digital Entertainment Conference (AIIDE-2010)*, pp. 57-62, Palo Alto, California, 2010.

161. K. Boyer, E. Ha, R. Phillips, M. Wallis, M. Vouk, and J. Lester. Dialogue Act Modeling in a Complex Task-Oriented Domain. *Proceedings of the Eleventh Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2010)*, pp. 297-305, Tokyo, 2010.

162. E. Ha, A. Baikadi, C. Licata, B. Mott, and J. Lester. Exploring the Effectiveness of Lexical Ontologies for Modeling Temporal Relations with Markov Logic. *Proceedings of the Eleventh Annual SIGDIAL Meeting on Discourse and Dialogue (SIGDIAL-2010)*, pp. 75-78, Tokyo, 2010.

163. J. Rowe, L. Shores, B. Mott, and J. Lester. Individual Differences in Gameplay and Learning: A Narrative-Centered Learning Perspective. *Proceedings of the Fifth International Conference on Foundations of Digital Games (FDG-2010)*, pp. 171-178, Monterey, California, 2010.

164. K. Boyer, R. Phillips, A. Ingram, E. Ha, M. Wallis, M. Vouk, and J. Lester. Characterizing the Effectiveness of Tutorial Dialogue with Hidden Markov Models. *Proceedings of the Tenth International Conference on Intelligent Tutoring Systems (ITS-2010)*, pp. 55-64, Pittsburgh, 2010.

165. J. Robison, S. McQuiggan, and J. Lester. Developing Empirically Based Student Personality Profiles for Affective Feedback Models. *Proceedings of the Tenth International Conference on Intelligent Tutoring Systems (ITS-2010)*, pp. 285–295, Pittsburgh, 2010.

166. J. Rowe, L. Shores, B. Mott, and J. Lester. Integrating Learning and Engagement in Narrative-Centered Learning Environments. *Proceedings of the Tenth International Conference on Intelligent Tutoring Systems (ITS-2010)*, pp. 166–177, Pittsburgh, 2010.

167. S. Lee, B. Mott, and J. Lester. Optimizing Story-Based Learning: An Investigation of Student Narrative Profiles. *Proceedings of the Tenth International Conference on Intelligent Tutoring Systems (ITS-2010)*, pp. 155–165, Pittsburgh, 2010.

168. K. Boyer, R. Phillips, E. Ha, M. Wallis, M. Vouk and J. Lester. A Preliminary Investigation of Hierarchical Hidden Markov Models for Tutorial Planning. *Proceedings of the Third International Conference on Educational Data Mining (EDM-2010)*, pp. 285-286, Pittsburgh, 2010.

169. K. Boyer, W. Lahti, R. Phillips, M. Wallis, M. Vouk, and J. Lester. Principles of Asking Effective Questions to Improve Student Problem Solving. *Proceedings of the 41st SIGCSE Technical Symposium on Computer Science Education (SIGCSE '10)*, pp. 460-464, Milwaukee, Wisconsin, 2010.

170. J. Robison, S. McQuiggan, and J. Lester. Evaluating the Consequences of Affective Feedback in Intelligent Tutoring Systems. *Proceedings of International Conference on Affective Computing and Intelligent Interaction (ACII-2009)*, pp. 37-42, Amsterdam, 2009.
    Award: **Best Student Paper Award**.

171. J. Robison, J. Rowe, S. McQuiggan, and J. Lester. Predicting User Psychological Characteristics from Interactions with Empathetic Virtual Agents. *Proceedings of the Ninth International Conference on Intelligent Virtual Agents (IVA-2009)*, pp. 330-336, Amsterdam, 2009.

172. J. Robison, S. McQuiggan, and J. Lester. Modeling Task-Based vs. Affect-based Feedback Behavior in Pedagogical Agents: An Inductive Approach. *Proceedings of the Fourteenth International Conference on Artificial Intelligence in Education (AIED-09)*, pp. 25-32, Brighton, UK, 2009.

173. K. Boyer, E. Ha, M. Wallis, R. Phillips, M. Vouk, and J. Lester. Discovering Tutorial Dialogue Strategies with Hidden Markov Models. *Proceedings of the Fourteenth International Conference on Artificial Intelligence in Education (AIED-09)*, pp. 141-148, Brighton, UK, 2009.

174. J. Rowe, S. McQuiggan, J. Robison, and J. Lester. Off-Task Behavior in Narrative-Centered Learning Environments. *Proceedings of the Fourteenth International Conference on Artificial Intelligence in Education (AIED-09)*, pp. 99-106, Brighton, UK, 2009.

175. K. Boyer, R. Phillips, E. Ha, M. Wallis, M. Vouk, and J. Lester. Modeling Dialogue Structure with Adjacency Pair Analysis and Hidden Markov Models. *Proceedings of the Annual Meeting of the North American Chapter of the Association for Computational Linguistics – Human Language Technologies (NAACL-HLT-09)*, pp. 49-52, Boulder, Colorado, 2009.

176. K. Boyer, R. Phillips, M. Wallis, M. Vouk, and J. Lester. The Impact of Instructor Initiative on Student Learning Through Assisted Problem Solving. *Proceedings of the 40th ACM Technical Symposium on Computer Science Education (SIGCSE-09)*, pp. 14-18, Chattanooga, Tennessee, 2009.

177. J. Rowe, E. Ha, and J. Lester. Archetype-Driven Character Dialogue Generation for Interactive Narrative. *Proceedings of the Eighth International Conference on Intelligent Virtual Agents (IVA-08)*, pp. 45-58, Tokyo, Japan, 2008.

178. S. McQuiggan, J. Rowe, S. Lee, and J. Lester. Story-based Learning: The Impact of Narrative on Learning Experiences and Outcomes. *Proceedings of the Ninth International Conference on Intelligent Tutoring Systems (ITS-08)*, pp. 530-539, Montreal, 2008.

179. K. Boyer, R. Phillips, M. Wallis, M. Vouk, and J. Lester. Balancing Cognitive and Motivational Scaffolding in Tutorial Dialogue. *Proceedings of the Ninth International Conference on Intelligent Tutoring Systems (ITS-08)*, pp. 239-249, Montreal, 2008.

180. S. McQuiggan, J. Goth, E. Ha, J. Rowe, and J. Lester. Student Note-Taking in Narrative-Centered Learning Environments: Individual Differences and Learning. *Proceedings of the Ninth International Conference on Intelligent Tutoring Systems (ITS-08)*, pp. 510-519, Montreal, 2008.

181. S. McQuiggan, J. Robison, and J. Lester. Affective Transitions in Narrative-Centered Learning Environments. *Proceedings of the Ninth International Conference on Intelligent Tutoring Systems (ITS-08)*, pp. 490-499, Montreal, 2008.

182. K. Boyer, T. Fondren, A. Dwight, M. Vouk, and J. Lester. A Development Environment for Distributed Synchronous Collaborative Programming. *Proceedings of the Thirteenth Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE-08)*, pp. 158-162, Madrid, 2008.

183. S. McQuiggan, J. Robison, R. Phillips, and J. Lester. Modeling Parallel and Reactive Empathy in Virtual Agents: An Inductive Approach. *Proceedings of the Seventh International Conference on Autonomous Agents and Multiagent Systems (AAMAS-08)*, pp. 167-174, Estoril, Portugal, 2008.

184. S. McQuiggan, J. Rowe, and J. Lester. The Effects of Empathetic Virtual Characters on Presence in Narrative-Centered Learning Environments. *Proceedings of the 2008 SIGCHI Conference on Human Factors in Computing Systems (CHI-08)*, pp. 1511-1520, Florence, Italy, 2008.

185. S. McQuiggan, S. Lee, and J. Lester. Early Prediction of Student Frustration. *Proceedings of the Second International Conference on Affective Computing and Intelligent Interactions (ACII-07)*, pp. 698-709, Lisbon, Portugal, 2007.

186. K. Boyer, M. Vouk, and J. Lester. The Influence of Learner Characteristics on Task-Oriented Tutorial Dialogue. *Proceedings of the Thirteenth International Conference on AI in Education (AIED-07)*, pp. 365-372, Marina del Rey, California, 2007.
    Award: **Best Student Paper Award**.

187. S. Lee, S. McQuiggan, and J. Lester. Inducing User Affect Recognition Models for Task-Oriented Environments. *Proceedings of the Eleventh International Conference on User Modeling (UM-07)*, pp. 380–384, Corfu, Greece, 2007.

188. B. Mott, S. Lee, and J. Lester. Probabilistic Goal Recognition in Interactive Narrative Environments. *Proceedings of the Twenty-First National Conference on Artificial Intelligence (AAAI-06)*, pp. 187-192, Boston, 2006.

189. S. McQuiggan, S. Lee, and J. Lester. Predicting User Physiological Response for Interactive Environments: An Inductive Approach. *Proceedings of the Second Conference on Artificial Intelligence and Interactive Entertainment (AIIDE-06)*, pp. 60-65, Marina del Rey, California, 2006.

190. S. McQuiggan and J. Lester. Diagnosing Self-Efficacy in Intelligent Tutoring Systems: An Empirical Study. *Proceedings of the Eighth International Conference on Intelligent Tutoring Systems (ITS-06)*, pp. 565-574, Jhongli, Taiwan, 2006.

191. B. Mott and J. Lester. Narrative-Centered Tutorial Planning for Inquiry-Based Learning Environments. *Proceedings of the Eighth International Conference on Intelligent Tutoring Systems (ITS-06)*, pp. 675-684, Jhongli, Taiwan, 2006.

192. S. McQuiggan and J. Lester. Learning Empathy: A Data-Driven Framework for Modeling Empathetic Companion Agents. *Proceedings of the Fifth International Conference on Autonomous Agents & Multiagent Systems (AAMAS-06)*, pp. 961-968, Hakodate, Japan, 2006.

193. B. Mott and J. Lester. U-DIRECTOR: A Decision-Theoretic Narrative Planning Architecture for Storytelling Environments. *Proceedings of the Fifth International Conference on Autonomous Agents & Multiagent Systems (AAMAS-06)*, pp. 977-984, Hakodate, Japan, 2006.

194. K. Branting, J. Lester, and B. Mott. Dialogue Management for Conversational Case-Based Reasoning. *Proceedings of the Seventh European Conference on Case-Based Reasoning (ECCBR-04),* Springer-Verlag Lecture Notes in AI 3155, pp. 77-90, Madrid, 2004.

195. C. Callaway and J. Lester. Pronominalization in Generated Discourse and Dialogue. *Proceedings of the 40th Meeting of the Association for Computational Linguistics (ACL-02)*, pp. 88-95, Philadelphia, 2002.

196. C. Callaway and J. Lester. Narrative Prose Generation. *Proceedings of the Seventeenth International Joint Conference on Artificial Intelligence (IJCAI-01)*, pp. 1241-1248, Seattle, 2001.

197. C. Callaway and J. Lester. Evaluating the Effects of Natural Language Generation Techniques on Reader Satisfaction. *Proceedings of the Twenty-Third Annual Conference of the Cognitive Science Society (CogSci-2001)*, pp. 164-169, Edinburgh, UK, August 2001.

198. S. Kahler, S. Converse, J. Lester, D. Cheatham, and G. Stelling. Effect of Intelligent Instruction on Students' Mental Models and Performance. *Proceedings of the Forty-Fourth Annual Meeting of the Human Factors & Ergonomics Society*, pp. 101-104, San Diego, 2000.

199. K. Branting, C. Callaway, B. Mott, and J. Lester. Integrating Discourse Knowledge and Domain Knowledge for Document Drafting. *Proceedings of the Seventh International Conference on AI & Law (ICAIL-99)*, pp. 214-220, Oslo, Norway, 1999.

200. B. Daniel, W. Bares, C. Callaway, and J. Lester. Student-Sensitive Multimodal Explanation Generation for 3D Learning Environments. *Proceedings of the Sixteenth National Conference on Artificial Intelligence (AAAI-99)*, pp. 114-120, Orlando, 1999.
    Symposium Publication: Also appears in *AAAI Symposium on Smart Graphics*, pp. 1–7, AAAI Spring Symposium Series, Palo Alto, 2000.

201. J. Grégoire, L. Zettlemoyer, and J. Lester. Detecting and Correcting Misconceptions with Lifelike Avatars in 3D Learning Environments. *Proceedings of the Ninth International Conference on Artificial Intelligence in Education (AIED-99)*, pp. 586-593, Le Mans, France, 1999.

202. J. Lester, L. Zettlemoyer, J. Grégoire, and W. Bares. Explanatory Lifelike Avatars: Performing User-Designed Tasks in 3D Learning Environments. *Proceedings of the Third International Conference on Autonomous Agents (Agents-99)*, pp. 24-31, Seattle, 1999.

203. W. Bares and J. Lester. Intelligent Multi-Shot Visualization Interfaces for Dynamic 3D Worlds. *Proceedings of the 1999 International Conference on Intelligent User Interfaces (IUI-99)*, pp. 119-126, Los Angeles, 1999.
    Award: **Best Paper Award**.

204. W. Bares, L. Zettlemoyer, and J. Lester. Habitable 3D Learning Environments for Situated Learning. *Proceedings of the Fourth International Conference on Intelligent Tutoring Systems (ITS-98)*, Springer-Verlag Lecture Notes in Computer Science 1452, pp. 76-85, San Antonio, Texas, 1998.

205. S. Towns, P. FitzGerald, J. Lester. Visual Emotive Communication in Lifelike Pedagogical Agents. *Proceedings of the Fourth International Conference on Intelligent Tutoring Systems (ITS-98)*, Springer-Verlag Lecture Notes in Computer Science 1452, pp. 474-483, San Antonio, Texas, 1998.

206. W. Bares, J. Grégoire, and J. Lester. Real-time Constraint-Based Cinematography for Complex Interactive 3D Worlds. *Proceedings of the Tenth National Conference on Innovative Applications of Artificial Intelligence (IAAI-98)*, pp. 1101-1106, Madison, Wisconsin, 1998.

207. S. Towns, C. Callaway, and J. Lester. Generating Coordinated Natural Language and 3D Animations for Complex Spatial Explanations. *Proceedings of the Fifteenth National Conference on Artificial Intelligence (AAAI-98)*, pp. 112-119, Madison, Wisconsin, 1998.
    Workshop Publication: Also appears in *AAAI Workshop on Representations for Multi-modal Human-Computer Interaction*, pp. 5–10, AAAI-98, Madison, Wisconsin, 1998.

208. W. Bares, L. Zettlemoyer, D. Rodriguez, and J. Lester. Task-Sensitive Cinematography Interfaces for Interactive 3D Learning Environments. *Proceedings of the 1998 International Conference on Intelligent User Interfaces (IUI-98)*, pp. 81-88, San Francisco, 1998.

209. S. Towns, C. Callaway, J. Voerman, and J. Lester. Coherent Gestures, Locomotion, and Speech in Life-Like Pedagogical Agents. *Proceedings of the 1998 International Conference on Intelligent User Interfaces (IUI-98)*, pp. 13-20, San Francisco, 1998.

210. J. Lester, S. Converse, B. Stone, S. Kahler, and S. Barlow. Animated Pedagogical Agents and Problem-Solving Effectiveness: A Large-Scale Empirical Evaluation. *Proceedings of the Eighth World Conference on Artificial Intelligence in Education (AIED-97)*, pp. 23-30, Kobe, Japan, 1997.
    Award: **Best Paper Award**.

211. C. Callaway and J. Lester. Dynamically Improving Explanations: A Revision-Based Approach to Explanation Generation. *Proceedings of the Fifteenth International Joint Conference on Artificial Intelligence (IJCAI-97)*, pp. 952-958, Nagoya, Japan, 1997.

212. W. Bares and J. Lester. Real-time Generation of Customized 3D Animated Explanations for Knowledge-Based Learning Environments. *Proceedings of the Fourteenth National Conference on Artificial Intelligence (AAAI-97)*, pp. 347-354, Providence, Rhode Island, 1997.

Workshop Publication: Also appears in *IJCAI Workshop on Intelligent Multimodal Systems*, pp. 71–77, IJCAI-97, Nagoya, Japan, 1997.

213. K. Branting, J. Lester, and C. Callaway. Automated Drafting of Self-Explaining Documents. *Proceedings of the Sixth International Conference on Artificial Intelligence and Law (ICAIL-97)*, pp. 72-81, Melbourne, Australia, 1997.

214. W. Bares and J. Lester. Cinematographic User Models for Automated Realtime Camera Control in Dynamic 3D Environments. *Proceedings of the Sixth International Conference on User Modeling (UM-97)*, pp. 215-226, Sardinia, Italy, 1997.

215. J. Lester, S. Converse, S. Kahler, T. Barlow, B. Stone, and R. Bhogal. The Persona Effect: Affective Impact of Animated Pedagogical Agents. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI-97)*, pp. 359-366, Atlanta, 1997.

216. J. Lester and B. Stone. Increasing Believability in Animated Pedagogical Agents. *Proceedings of the First International Conference on Autonomous Agents (Agents-97)*, pp. 16-21, Marina del Rey, California, 1997.

217. J. Lester, P. FitzGerald, and B. Stone. The Pedagogical Design Studio: Exploiting Artifact-Based Task Models for Constructivist Learning. *Proceedings of the Third International Conference on Intelligent User Interfaces (IUI-97)*, pp. 155-162, Orlando, Florida, 1997.

218. K. Branting and J. Lester. A Framework for Self-Explaining Legal Documents. *Proceedings of the Ninth International Conference on Legal Knowledge-Based Systems*, pp. 77-90, Tilburg University, The Netherlands, 1996.

219. J. Lester and B. Porter. Scaling Up Explanation Generation: Large-Scale Knowledge Bases and Empirical Studies. *Proceedings of the Thirteenth National Conference on Artificial Intelligence (AAAI-96)*, pp. 416-423, Portland, Oregon, 1996.

220. B. Stone and J. Lester. Dynamically Sequencing an Animated Pedagogical Agent. *Proceedings of the Thirteenth National Conference on Artificial Intelligence (AAAI-96)*, pp. 424-431, Portland, Oregon, 1996.

    Anthology: Anthologized in *Readings in Agents*, Huhns, M. & Singh, M. (Eds.), pp. 156–163, Morgan Kaufmann, 1998.

221. J. Lester, B. Stone, M. O'Leary, and R. Stevenson. Focusing Problem Solving in Design-Centered Learning Environments. *Proceedings of the Third International Conference on Intelligent Tutoring Systems (ITS-96), Springer-Verlag Lecture Notes in Computer Science 1086*, pp. 475-483, Montreal, 1996.

222. M. Dailey, G. Miller, and J. Lester. Exploiting Stereotypes to Eliminate Strategic Bias. *Proceedings of the Fifth International Conference on User Modeling (UM-96)*, pp. 201-203, Kailua-Kona, Hawaii, 1996.

223. J. Lester and B. Porter. A Student-Sensitive Discourse Generator for Intelligent Tutoring Systems. *Proceedings of the International Conference on the Learning Sciences*, pp. 298-304, Chicago, 1991.

224. J. Lester and B. Porter. A Revision-Based Model of Instructional Multi-Paragraph Discourse Production. *Proceedings of the Thirteenth Cognitive Science Society Conference*, pp. 796-800, Chicago, 1991.

225. A. Souther, L. Acker, J. Lester, and B. Porter. Using View Types to Generate Explanations in Intelligent Tutoring Systems. *Proceedings of the Eleventh Cognitive Science Society Conference*, pp. 123-130, Ann Arbor, Michigan, 1989.

Papers in Symposia and Workshop Proceedings

1. F. Fahid, J. Rowe, Y. Kim, S. Srivastava, and J. Lester. Online Reinforcement Learning-Based Pedagogical Planning for Narrative-Centered Learning Environments. *Proceedings of the Fourteenth*

Symposium on Educational Advances in Artificial Intelligence (EAAI-2024), pp. 23191-23199, Vancouver, 2024.

2. A. Gupta, S. Lee, B. Mott, S. Chakraburty, K. Glazewski, A. Ottenbreit-Leftwich, A. Scribner, C. Hmelo-Silver, and J. Lester. Supporting Upper Elementary Students in Learning AI Concepts with Story-Driven Game-Based Learning. *Proceedings of the Fourteenth Symposium on Educational Advances in Artificial Intelligence (EAAI-2024)*, pp. 23092-23100, Vancouver, 2024.
3. A. Goslen, Y. Kim, J. Rowe, and J. Lester. Language Modeling for Plan Generation in Game-Based Learning Environments. *Proceedings of the AIED-2023 Workshop on Empowering Education with LLMs – The Next-Gen Interface and Content Generation*, Tokyo, 2023.
4. N. Wang and J. Lester. AI Education for K-12: A Survey. *Proceedings of the AIED-2023 Workshop on AI Education in K-12*, Tokyo, 2023.
5. J. Pande, S. Paul, W. Min, R. Spain, and J. Lester. Improving Dialogue Classification Models to Support Generalizable Team Communication Analytics in GIFT. *Proceedings of the Eleventh Annual GIFT Users Symposium (GIFTSym11)*, 127-135, Orlando, 2023.
6. A. Smith, R. Spain, N. Roberts, B. Goldberg, J. Rowe, B. Mott, and J. Lester. Supporting Data-Driven Team Feedback and Scenario Adaptations in GIFT. *Proceedings of the Eleventh Annual GIFT Users Symposium (GIFTSym11)*, 145-153, Orlando, 2023.
7. R. Spain, A. Smith, J. Rowe, B. Goldberg, and J. Lester. Toward Competency-Driven Team Performance Measurement and Coaching in GIFT. *Proceedings of the AIED-2022 Workshop on Advances and Opportunities in Team Tutoring*, pp. 4-10, Durham, England / Hybrid, 2022.
8. A. Smith, R. Spain, J. Rowe, B. Goldberg, and J. Lester. Formalizing Adaptive Team Feedback in Synthetic Training Environments with Reinforcement Learning. *Proceedings of the Tenth Annual GIFT Users Symposium (GIFTSym10)*, pp. 117-126, Virtual, 2022.
9. R. Spain, W., Min, J. Saville, A. Emerson, J. Pande, K. Brawner, and J. Lester. Leveraging Advances in Natural Language Processing to Support Team Communication Analytics in GIFT. *Proceedings of the Tenth Annual GIFT Users Symposium (GIFTSym10)*, pp. 147-156, Virtual, 2022.
10. A. Gupta, D. Carpenter, W. Min, J. Rowe, R. Azevedo and J. Lester. Multimodal, Multi-Task Stealth Assessment for Reflection-Enriched Game-Based Learning. *Proceedings of the AIED-2021 Workshop on Multimodal Artificial Intelligence in Educati*on, pp. 93-102, Virtual, 2021.
11. R. Spain, W. Min, J. Saville, K. Brawner, B. Mott, and J. Lester. Automated Assessment of Teamwork Competencies using Evidence-Centered Design-Based Natural Language Processing Approach. *Proceedings of the Ninth Annual GIFT Users Symposium (GIFTSym9*), pp. 140-149, Virtual, 2021.
12. R. Spain, J. Rowe, B. Goldberg, R. Pokorny, B. Mott, and J. Lester. Automated Coaching in Synthetic Training Environments: Developing and Adaptive Team Feedback Framework. *Proceedings of the Ninth Annual GIFT Users Symposium (GIFTSym9)*, pp. 187-199, Virtual, 2021.
13. S. Lee, B. Mott, A. Ottenbreit-Leftwich, A. Scribner, S. Taylor, K. Park, J. Rowe, K. Glazewski, C. Hmelo-Silver, and J. Lester. AI-Infused Collaborative Inquiry in Upper Elementary School: A Game-Based Learning Approach. *Proceedings of the Eleventh Symposium on Educational Advances in Artificial Intelligence (EAAI-2021)*, Virtual, 2021.
14. B. Akram, W. Min, H. Azizsoltani, E. Wiebe, A. Navied, B. Mott, K. Boyer, and J. Lester. A Data-Driven Approach to Automatically Assessing Concept-Level CS Competencies Based on Student Programs. *Proceedings of the EDM-2020 Workshop on Educational Data Mining in Computer Science Education*, Virtual, 2020.
15. J. Rowe, R. Spain, B. Goldberg, R. Pokorny, B. Mott, and J. Lester. Toward Data-Driven Models of Team Feedback in Synthetic Training Environments with GIFT. *Proceedings of the Eighth Annual GIFT User Symposium GIFTSym8)*, pp. 136-144, Orlando, Florida, 2020.

16. R. Spain, W. Min, J. Saville, B. Mott, K. Brawner, J. Johnston, G. Goodwin, and J. Lester. Team Communication Analytics Using Automated Speech Recognition. *Proceedings of the Eighth Annual GIFT User Symposium (GIFTSym8)*, pp. 145-154, Orlando, Florida, 2020.

17. F. Rodríguez, C. Smith, A. Smith, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Towards a Responsive Interface to Support Novices in Block-Based Programming. *Proceedings of the VL/HCC-2019 Workshop on Blocks and Beyond*, Memphis, 2019.

18. S. Taylor, W. Min, B. Mott, A. Emerson, A. Smith, E. Wiebe, and J. Lester. IntelliBlox: A Toolkit for Integrating Block-Based Programming into Game-Based Learning Environments. *Proceedings of the VL/HCC-2019 Workshop on Blocks and Beyond*, Memphis, 2019.

19. Z. Wu, B. Mott, W. Min, R. Taylor, D. Boulden, T. Lord, F. Reichsman, C. Dorsey, E. Wiebe, and J. Lester. Predicting Challenge Outcomes for Students in a Digital Game for Learning Genetics. *Proceedings of the EDM-2019 Workshop on EDM & Games: Leveling Up Engaged Learning with Data-Rich Analytics*, Montreal, 2019.

20. N. Henderson, J. Rowe, B. Mott and J. Lester. Sensor-based Data Fusion for Multimodal Affect Detection in Game-based Learning Environments. *Proceedings of the EDM-2019 Workshop on EDM & Games: Leveling Up Engaged Learning with Data-Rich Analytics*, Montreal, 2019.

21. J. Rowe, W. Min, S. Lee, B. Mott, and J. Lester. Toward Data-Rich Models of Visitor Engagement with Multimodal Learning Analytics. *Proceedings of the AIED-2019 Workshop on Adaptive and Intelligent Technologies for Informal Learning*, Chicago, 2019.

22. R. Spain, M. Geden, W. Min, B. Mott, and J. Lester. Towards Computational Models of Team Effectiveness with Natural Language Processing. *Proceedings of the AIED-2019 Workshop on Approaches and Challenges in Team Tutoring*, Chicago, 2019.

23. R. Spain, J. Rowe, B. Goldberg, R. Pokorny, B. Mott, and J. Lester. Towards Data-Driven Tutorial Planning for Counterinsurgency Training in GIFT: Preliminary Findings and Lessons Learned. *Proceedings of the Seventh Annual GIFT User Symposium (GIFTSym7)*, pp. 111-120, Orlando, Florida, 2019.

24. J. Rowe, A. Smith, R. Spain, and J. Lester. Understanding Novelty in Reinforcement Learning-Based Automated Scenario Generation. *Proceedings of the Seventh Annual GIFT User Symposium (GIFTSym7)*, pp. 76-83, Orlando, Florida, 2019.

25. N. Henderson, J. Rowe, and J. Lester. Multimodal Machine Learning in Adaptive Instructional Systems: A Survey. *Proceedings of the Seventh Annual GIFT User Symposium (GIFTSym7)*, pp. 66-75, Orlando, Florida, 2019.

26. V. Cateté, N. Lytle, Y. Dong, D. Boulden, B. Akram, J. Houchins, T. Barnes, E. Wiebe, J. Lester, B. Mott, and K. Boyer. Infusing Computational Thinking into Middle Grade Science Classrooms: Lessons Learned. *Proceedings of the Thirteenth Workshop on Primary and Secondary Computing Education (WiPSCE-2018)*, Potsdam, Germany, 2018.

27. J. Rowe, R. Spain, R. Pokorny, B. Mott, B. Goldberg, and J. Lester. Design and Development of an Adaptive Hypermedia-Based Course for Counterinsurgency Training in GIFT. *Proceedings of the Sixth Annual GIFT User Symposium (GIFTSym6)*, pp. 229-239, Orlando, Florida, 2018.

28. J. Rowe, A. Smith, R. Pokorny, B. Mott, and J. Lester. Toward Automated Scenario Generation with Deep Reinforcement Learning in GIFT. *Proceedings of the Sixth Annual GIFT User Symposium (GIFTSym6)*, pp. 65-74, 2018.

29. J. Wiggins, M. Kulkarni, W. Min, B. Mott, K. Boyer, E. Wiebe, and J. Lester. User Affect and No-Match Dialogue Scenarios: An Analysis of Facial Expression. *Proceedings of the ICMI-2018 Workshop on Multimodal Analyses Enabling Artificial Agents in Human-Machine Interaction*, pp. 6-14, Boulder, Colorado, 2018.

30. J. Rowe, B. Pokorny, B. Goldberg, B. Mott, and J. Lester. Toward Simulated Students for Reinforcement Learning-Driven Tutorial Planning in GIFT. *Proceedings of the Fifth Annual GIFT User Symposium (GIFTSym5)*, Orlando, Florida, 2017.

31. W. Min, B. Mott, J. Rowe, and J. Lester. Deep LSTM-based Goal Recognition Models for Open-World Digital Games. *Proceedings of the AAAI Workshop on Plan, Activity and Intent Recognition*, pp. 851-858, San Francisco, 2017.

32. J. Rowe, M. Frankosky, B. Mott, J. Lester, B. Pokorny, W. Peng, and B. Goldberg. Extending GIFT with a Reinforcement Learning-Based Framework for Generalized Tutorial Planning. *Proceedings of the Fourth Annual GIFT User Symposium (GIFTSym4)*, pp. 87-97, 2016.

33. J. DeFalco, V. Georgoulas-Sherry, L. Paquette, R. Baker, J. Rowe, B. Mott, and J. Lester. Motivational Feedback Messages as GIFT Interventions to Frustration. *Proceedings of the Fourth Annual GIFT User Symposium (GIFTSym4)*, pp. 25-35, 2016.

34. J. Harley, J. Rowe, J. Lester, and C. Frasson. Designing Story-Centric Games for Player Emotion: A Theoretical Perspective. *Proceedings of the Workshop on Intelligent Narrative Technologies and Social Believability in Games*, pp. 34-37, Santa Cruz, California, 2015.

35. S. Leeman-Munk, J. Lester, and J. Cox. NCSU_SAS_SAM: Deep Encoding and Reconstruction for Normalization of Noisy Text. *Proceedings of the ACL-2015 Workshop on Noisy User-generated Text (W-NUT)*, pp. 154-161, Beijing, China, 2015.

36. J. Rowe, B. Mott, and J. Lester. Opportunities and Challenges in Generalizable Sensor-Based Affect Recognition for Learning. *Proceedings of the AIED-15 Workshop on Developing a Generalized Intelligent Framework for Tutoring (GIFT): Informing Design through a Community of Practice*, pp. 24-30, Madrid, Spain, 2015.

37. J. DeFalco, R. Baker, L. Paquette, V. Georgoulas, J. Rowe, B. Mott, and J. Lester. Motivational Feedback Designs for Frustration in a Simulation-based Combat Medic Training Environment. *Proceedings of the Third Annual GIFT User Symposium (GIFTSym3)*, pp. 81-88, Orlando, Florida, 2015.

38. J. Rowe, B. Mott, J. Lester, B. Pokorny, W. Peng, and B. Goldberg. Toward a Modular Reinforcement Learning Framework for Tutorial Planning in GIFT. *Proceedings of the Third Annual GIFT User Symposium (GIFTSym3)*, pp. 89-100, Orlando, FL, 2015.

39. J. Rowe, B. Mott, and J. Lester. It's All About the Process: Building Sensor-Driven Emotion Detectors with GIFT. *Proceedings of the Second Annual GIFT User Symposium (GIFTSym2)*, pp. 135-143, Pittsburgh, 2014.

40. R. Taylor, A. Smith, S. Leeman-Munk, B. Mott, and J. Lester. Towards ITS Authoring Tools for Domain Experts. *Proceedings of the ITS-2014 Workshop on Intelligent Tutoring System Authoring Tools*, Honolulu, Hawaii, 2014.

41. S. Leeman-Munk, A. Shelton, E. Wiebe, and J. Lester. Towards Domain-Independent Assessment of Elementary Students' Science Competency using Soft Cardinality. *Proceedings of the Ninth Workshop on Innovative Use of NLP for Building Educational Applications (BEA-2014)*, pp. 61-67, Baltimore, 2014.

42. J. Wiggins, J. Grafsgaard, C. Mitchell, K. Boyer, E. Wiebe, and J. Lester. Exploring the Relationship between Self-Efficacy and the Effectiveness of Tutorial Interactions. *Proceedings of the ITS-2014 Workshop on AI-supported Education for Computer Science*, pp. 31-40, Honolulu, Hawaii, 2014.

43. W. Min, B. Mott, and J. Lester. Adaptive Scaffolding in an Intelligent Game-Based Learning Environment for Computer Science. *Proceedings of the ITS-2014 Workshop on AI-supported Education for Computer Science*, pp. 41-50, Honolulu, Hawaii, 2014.

44. J. Rowe and J. Lester. A Modular Reinforcement Learning Framework for Interactive Narrative Planning. *Proceedings of the Sixth Workshop on Intelligent Narrative Technologies (INT6)*, pp. 57-63, Boston, 2013.

45. A. Baikadi, J. Rowe, B. Mott, and J. Lester. Improving Goal Recognition in Interactive Narratives with Models of Narrative Discovery Events. *Proceedings of the Sixth Workshop on Intelligent Narrative Technologies (INT6)*, pp. 2-8, Boston, 2013.

46. C. Mitchell, K. Boyer, and J. Lester. When to Intervene: Toward a Markov Decision Process Dialogue Policy for Computer Science Tutoring. *Proceedings of the AIED-2013 Workshop on AI-supported Education for Computer Science*, pp. 40-49, Memphis, Tennessee, 2013.

47. J. Rowe, E. Lobene, J. Sabourin, B. Mott, and J. Lester. Run-Time Affect Modeling in a Serious Game with the Generalized Intelligent Framework for Tutoring. *Proceedings of the AIED-2013 GIFT User Meeting*, pp. 95-104, Memphis, Tennessee, 2013.

48. J. Rowe, E. Lobene, B. Mott, and J. Lester. Embedded Scaffolding for Reading Comprehension in Open-Ended Narrative-Centered Learning Environments. *Proceedings of the AIED-2013 Workshop on Scaffolding in Open-Ended Learning Environments*, Memphis, Tennessee, 2013.

49. J. Sabourin, J. Rowe, B. Mott, and J. Lester. Exploring Affect and Inquiry in Open-Ended Game-based Learning Environments. *Proceedings of the ITS-2012 Workshop on Emotions in Games for Learning*, Chania, Crete, Greece, 2012.

50. J. Goth, E. Ha, and J. Lester. Towards a Model of Question Generation for Promoting Creativity in Novice Writers. *Working Notes of the 2011 AAAI Fall Symposium on Question Generation*, pp. 23-26, Arlington, Virginia, 2011.

51. J. Sabourin, B. Mott, and J. Lester. Generalizing Models of Student Affect in Game-Based Learning Environments. *Proceedings of the ACII-2011 Workshop on Machine Learning for Affective Computing*, pp. 588-597, Memphis, Tennessee, 2011.

52. S. Lee, B. Mott, and J. Lester. Learning Director Agent Strategies: An Inductive Framework for Modeling Director Agents. *Proceedings of the Fourth Workshop on Intelligent Narrative Technologies (INT4)*, pp. 37-40, Palo Alto, California, 2011.

53. A. Baikadi, J. Goth, C. Mitchell, E. Ha, B. Mott, and J. Lester. Towards a Computational Model of Narrative Visualization. *Proceedings of the Fourth Workshop on Intelligent Narrative Technologies (INT4)*, pp. 2-9, Palo Alto, California, 2011.

54. E. Ha, A. Baikadi, C. Licata, and J. Lester. NCSU: Modeling Temporal Relations with Markov Logic and Lexical Ontology. *Proceedings of the Fifth International Workshop on Semantic Evaluation (SemEval-2010)*, pp. 341-344, Uppsala, Sweden, 2010.

55. J. Rowe, L. Shores, B. Mott, and J. Lester. A Framework for Narrative Adaptation in Interactive Story-Based Learning Environments. *Proceedings of the Third Workshop on Intelligent Narrative Technologies (INT3)*, Monterey, California, 2010.

56. S. Lee, B. Mott, and J. Lester. Investigating Director Agents' Decision Making in Interactive Narrative: A Wizard-of-Oz Study. *Proceedings of the Third Workshop on Intelligent Narrative Technologies*, Monterey, California, 2010.

57. J. Goth, A. Baikadi, E. Ha, J. Rowe, B. Mott, and J. Lester. Exploring Individual Differences in Student Writing with a Narrative Composition Support Environment. *Proceedings of the NAACL-2010 Workshop on Computational Linguistics and Writing: Writing Processes and Authoring Aids*, pp. 56-64, Los Angeles, 2010.

58. K. Boyer, R. Phillips, E. Ha, M. Wallis, M. Vouk, and J. Lester. Leveraging Hidden Dialogue State to Select Tutorial Moves. *Proceedings of the Fifth NAACL-HLT Workshop on Innovative Use of NLP for Building Educational Applications*, pp. 66-73, Los Angeles, California, 2010.

59. L. Shores, J. Robison, J. Rowe, K. Hoffmann, and J. Lester. Narrative-Centered Learning Environments: A Self-Regulated Learning Perspective. *Working Notes of the 2009 AAAI Fall Symposium on Cognitive and Metacognitive Educational Systems*, pp. 87-92, Arlington, Virginia, 2009.

60. K. Boyer, W. Lahti, R. Phillips, M. Wallis, M. Vouk, and J. Lester. An Empirically Derived Question Taxonomy for Task-Oriented Tutorial Dialogue. *Proceedings of the Second Workshop on Question Generation*, pp. 9-16, Brighton, UK, 2009.

61. J. Rowe, B. Mott, S. McQuiggan, J. Robison, S. Lee, and J. Lester. Crystal Island: A Narrative-Centered Learning Environment for Eighth Grade Microbiology. *Proceedings of the AIED-09 Workshop on Intelligent Educational Games*, pp. 11-20, Brighton, UK, 2009.

62. K. Boyer, E. Ha, R. Phillips, M. Wallis, M. Vouk, and J. Lester. Inferring Tutorial Dialogue Structure with Hidden Markov Modeling. *Proceedings of the Fourth Workshop on Innovative Use of NLP for Building Educational Applications*, pp. 19-26, Boulder, Colorado, 2009.

63. J. Rowe, S. McQuiggan, J. Robison, D. Marcey, and J. Lester. StoryEval: An Empirical Evaluation Framework for Narrative Generation. *Working Notes of the 2009 AAAI Spring Symposium on Narrative Technologies II*, pp. 103-110, Palo Alto, California, 2009.

64. K. Boyer, R. Phillips, M. Wallis, M. Vouk and J. Lester. Learner Characteristics and Feedback in Tutorial Dialogue. *Proceedings of the Third Workshop on Innovative Use of NLP for Building Educational Applications*, pp. 53-61, Columbus, Ohio, 2008.

65. S. McQuiggan, K. Hoffman, J. Nietfeld, J. Robison, and J. Lester. Examining Self-Regulated Learning in a Narrative-Centered Learning Environment: An Inductive Approach to Modeling Meta-Cognitive Monitoring. *Proceedings of the ITS-08 Workshop on Meta-Cognition and Self-Regulated Learning in Educational Technologies*, pp. 51-60, Montreal, 2008.

66. J. Robison, S. McQuiggan, and J. Lester. Differential Affective Experiences in Narrative-Centered Learning Environments. *Proceedings of the ITS-08 Workshop on Emotional and Cognitive Issues in Intelligent Tutoring Systems*, pp. 91-98, Montreal, 2008.

67. J. Rowe, S. McQuiggan, and J. Lester. Narrative Presence in Intelligent Learning Environments. *Working Notes of the 2007 AAAI Fall Symposium on Intelligent Narrative Technologies*, pp. 126-133, Washington, DC, 2007.

68. J. Rowe, S. McQuiggan, B. Mott, and J. Lester. Motivation in Narrative-Centered Learning Environments. *Proceedings of the AIED'07 Workshop on Narrative Learning Environments*, pp. 40-49, Marina del Rey, California, 2007.

69. S. McQuiggan and J. Lester. Leveraging Affect for Narrative-Centered Guided Discovery Learning Environments. *Proceedings of the AIED-07 Workshop on Modeling and Scaffolding Affective Experiences to Impact Learning*, pp. 67-74, Marina del Rey, California, 2007.

70. B. Mott, S. McQuiggan, S. Lee, S. Y. Lee, and J. Lester. Narrative-Centered Learning Environments for Guided Discovery Learning. *AAMAS-06 Workshop on Agent-Based Systems for Human Learning*, pp. 22-28, Hakodate, Japan, 2006.

71. B. Mott, J. Lester, and K. Branting. The Role of Syntactic Analysis in Textual Case Retrieval. *ICCBR-06 Workshop on Textual Case-Based Reasoning*, pp. 120-127, Chicago, IL, 2005.

72. B. Mott, C. Callaway, L. Zettlemoyer, S. Lee, and J. Lester. Towards Narrative-Centered Learning Environments. *Symposium on Narrative Intelligence, AAAI Fall Symposium* Series, pp. 78-82, Cape Cod, MA, 1999.

73. C. Callaway, B. Daniel, J. Lester. Multilingual Natural Language Generation for 3D Learning Environments. *Proceedings of the Argentine Symposium on Artificial Intelligence*, pp. 177-190, Buenos Aires, Argentina, 1999.

74. J. Rickel, L. Johnson, and J. Lester. Why Use an Animated Pedagogical Agent? *AI-ED '99 Workshop on Instructional Uses of Animated and Personified Agents*, pp. 62-69, Le Mans, France, 1999.

75. J. Lester, S. Towns, C. Callaway, and P. FitzGerald. Deictic and Emotive Communication in Animated Pedagogical Agents. *Proceedings of the Workshop on Embodied Conversational Characters*, pp. 67-76, Lake Tahoe, California, 1998.

76. J. Lester, C. Callaway, and S. Towns. Creating Lifelike Behaviors in Animated Pedagogical Agents. *ITS-98 Workshop on Pedagogical Agents*, pp. 27-32, San Antonio, 1998.

77. J. Lester, J. Voerman, S. Towns, and C. Callaway. Cosmo: A Life-like Animated Pedagogical Agent with Deictic Believability. *IJCAI-97 Workshop on Animated Interface Agents: Making Them Intelligent*, pp. 61-69, Nagoya, Japan, 1997.

78. C. Elliott, J. Rickel, and J. Lester. Integrating Affective Computing into Animated Tutoring Agents. *IJCAI-97 Workshop on Animated Interface Agents: Making Them Intelligent*, pp. 113-121, Nagoya, Japan, 1997.

79. J. Lester, C. Callaway, B. Stone, and S. Towns. Mixed Initiative Problem Solving with Animated Pedagogical Agents. *Symposium for Computational Models for Mixed Initiative Interaction, AAAI Spring Symposium Series*, pp. 98-104, Palo Alto, California, 1997.
    Workshop Publication: Also appears in *AI-ED '97 Workshop on Pedagogical Agents*, Eighth World Conference on Artificial Intelligence in Education (AI-ED 97), Kobe, Japan.

80. K. Branting and J. Lester. Justification Structures for Document Reuse. *Working Notes of the Third European Workshop on Case-Based Reasoning*, pp. 76-90, Lausanne, Switzerland, 1996.

81. J. Lester, M. O'Leary, and B. Stone. Animated Pedagogical Agents for Intelligent Edutainment. *AAAI Workshop on Entertainment & AI/A-Life*, pp. 44-49, AAAI-96, Portland, Oregon, 1996.

82. C. Callaway and J. Lester. Robust Natural Language Generation from Large-Scale Knowledge Bases. *Proceedings of the Fourth Bar-Ilan Symposium on Foundations of Artificial Intelligence*, pp. 96-105, Jerusalem, Israel, 1995.

83. J. Lester and B. Porter. The KNIGHT Experiments: Empirically Evaluating an Explanation Generation System. *Symposium for Empirical Methods in Discourse Interpretation and Generation, AAAI Spring Symposium Series*, pp. 74-80, Palo Alto, California, 1995.

84. J. Lester and B. Porter. "Interruption Handling:" Using Dynamic Replanning and Partially Refined Plans to Deal with Users' Interruptions. *AAAI Workshop on Planning for Interagent Communication*, pp. 71-77, AAAI-94, Seattle, Washington, 1994.

85. J. Lester and B. Porter. Designing Multi-Media Knowledge Delivery Systems: The Strong Representation Paradigm. *Symposium for Intelligent Multi-Media Multi-Modal Systems*, AAAI Spring Symposium Series, pp. 64-72, Palo Alto, California, 1994.

86. J. Lester and B. Porter. An Architecture for Planning Multi-Paragraph Pedagogical Explanations. *AAAI Workshop on the Comparative Analysis of Explanation Planning Architectures*, pp. 27-41, AAAI-91, Anaheim, California, 1991.

87. J. Lester and B. Porter. Generating Integrative Explanations: A Delayed-Commitment Approach. *AAAI Workshop on Explanation*, pp. 80-89, AAAI-90, Boston, 1990.

88. Souther, J. Lester, L. Acker, and B. Porter. Accessing Information from a Large-Scale Botany Knowledge Base Designed for Multiple Tasks. *Symposium for AI and Molecular Biology, AAAI Spring Symposium Series*, pp. 141-143, Palo Alto, California, 1990.

89. J. Lester, L. Acker, A. Souther, and B. Porter. Generating Presentations of Domain Knowledge. *Symposium for Knowledge-Based Environments for Learning and Teaching, AAAI Spring Symposium Series*, pp. 41-45, Palo Alto, California, 1990.

Invited Papers

1. J. Lester, M. Bansal, G. Biswas, C. Hmelo-Silver, and J. Roschelle. The AI Institute for Engaged Learning. *AI Magazine*, 45(1), 69-76, 2024.

2. L. Johnson and J. Lester. Pedagogical Agents: Back to the Future. *AI Magazine*, 39(2), 33-44, 2018.

3. H. Spires and J. Lester. Game-based Learning: Creating a Multidisciplinary Community of Inquiry. *On the Horizon*, 24(1), 88-93, 2016.

4. J. Lester, E. Ha, S. Lee, B. Mott, J. Rowe, and J. Sabourin. Serious Games Get Smart: Intelligent Game-Based Learning Environments. *AI Magazine*, 34(4), 31-45, 2013.

5. J. Rowe, B. Mott, and J. Lester. Narrative-Centered Learning Environments. In *Encyclopedia of the Sciences of Learning*, Seel, N. (ed.), pp. 2423-2426, Springer, 2011.

6. J. Lester. Reflections on the KVL Tutoring Framework: Past, Present, and Future. *International Journal of Artificial Intelligence in Education*, 16(3), pp. 271-276, 2006.
(Invited Commentary)

7. J. Lester, W. Bares, C. Callaway, and S. Towns. Natural Language Generation Journeys to Interactive 3D Worlds. Invited paper for keynote address, *Proceedings of the Ninth International Workshop on Natural Language Generation*, pp. 2-7, Niagara-on-the-Lake, Ontario, Canada, 1998.

8. J. Lester. Intelligent Virtual Teachers. Invited paper for invited lecture, *Proceedings of Imagina '98*, pp. 148-152, Monaco, 1998.

Additional Publications

1. N. Wang, J. Lester, and S. Basu. *Building Capacity for K-12 Artificial Intelligence Education Research: Workshop 3 Report*, 2022.

2. N. Wang, J. Lester, and S. Basu. *Building Capacity for K-12 Artificial Intelligence Education Research: Workshop 2 Report*, 2022.

3. N. Wang, J. Lester, and S. Basu. *Building Capacity for K-12 Artificial Intelligence Education Research: Workshop 1 Report*, 2021.

4. E. Ozer and J. Lester. Editorial: Innovative Technologies to Improve Adolescent and Young Adult Health. *Journal of Adolescent Health*, 67(2), S3, 2020.

5. J. Roschelle, J. Lester, and J. Fusco (eds.). AI and the Future of Learning: Expert Panel Report. Digital Promise, 2020.

6. D. Boulden, E. Wiebe, B. Akram, O. Aksit, P. Buffum, B. Mott, K. Boyer, and J. Lester. Computational Thinking Integration into Middle Grades Science Classrooms: Strategies for Meeting the Challenges. *Middle Grades Review* 4(3), 2018.

7. P. Buffum, M. Frankosky, K. Boyer, E. Wiebe, B. Mott, and J. Lester. Collaboration and Gender Equity in Game-based Learning for Middle School Computer Science. *IEEE Computing in Science and Engineering*, 18(2), 18-28, 2016.

8. H. Spires, K. Turner, and J. Lester. Twenty-first Century Skills and Game-based Learning. *Proceedings of the World Conference on Educational Multimedia, Hypermedia, and Telecommunications* (ED-MEDIA-08), pp. 5438-5443, Vienna, Austria, 2008.

9. J. Nietfeld, K. Hoffmann, S. McQuiggan, and J. Lester. Self-regulated Learning in a Narrative Centered Learning Environment. *Proceedings of the World Conference on Educational Multimedia, Hypermedia, and Telecommunications* (ED-MEDIA-08), pp. 5322-5327, Vienna, Austria, 2008.

10. R. Moreno, R. Mayer, and J. Lester. Life-Like Pedagogical Agents in Constructivist Multimedia Environments: Cognitive Consequences of Their Interaction. *Proceedings of the World Conference on Educational Multimedia, Hypermedia, and Telecommunications* (ED-MEDIA-2000), pp. 741-746, Montreal, 2000.
    Award: **Outstanding Paper Award**.

11. J. Lester and P. FitzGerald. Animated Pedagogical Agents: The Next Generation of Intelligent Educational Technology. *Design in the Information Age: A Report to the National Science Foundation*, pp. 111-117, 1997.

12. M. Vouk, A. Rindos, S. Woolet, J. Hines, and J. Lester. ATM Technology Enabling Educational Applications Across the North Carolina Information Highway. *Telecom '95*, pp. 519-522, Geneva, Switzerland, 1995.

13. B. Porter, L. Acker, J. Lester, and A. Souther. Generating Explanations in an Intelligent Tutor Designed to Teach Fundamental Knowledge. *Proceedings of the Second Intelligent Tutoring Systems Research Forum*, pp. 55-69, San Antonio, Texas, 1989.

Technical Reports

1. J. Lester. Generating Natural Language Explanations from Large-Scale Knowledge Bases. Computer Science Technical Report TR-94-11, North Carolina State University, 1994.
2. J. Lester and B. Porter. Generating Context-Sensitive Explanations in Interactive Knowledge-Based Systems. AI Laboratory Technical Report AI91-160, University of Texas at Austin, May 1991.
3. B. Porter, J. Lester, K. Murray, K. Pittman, A. Souther, L. Acker, and T. Jones. AI Research in the Context of a Multifunctional Knowledge Base: The Botany Knowledge Base Project. AI Laboratory Technical Report AI88-88, University of Texas at Austin, September 1988.

Dissertation

1. J. Lester. *Generating Natural Language Explanations from Large-Scale Knowledge Bases*, University of Texas at Austin, Austin, Texas, 1994.

Patents

1. S. Leeman-Munk, W. Min, B. Mott, J. Lester, and J. Cox. *Normalizing Electronic Communications Using a Neural-Network Normalizer and a Neural-Network Flagger*. U.S. Patent 9,552,547. Filed: November 2015. Issued: January 2017.
2. J. Lester, L. Zettlemoyer, B. Mott, and W. Bares. *Methods, Systems, and Computer Program Products for Providing Automated Customer Service via an Intelligent Virtual Agent that is Trained Using Customer-agent Conversations*. U.S. Patent 7,305,345. Filed: February 2001. Issued: December 2007.

Lectures

Conference and Workshop Invited Speaker Presentations

1. Keynote Address, NIH SciEd
   AI Goes to School: The Future of Learning Technologies in the Age of AI
   Salt Lake City, Utah, May 2024.
2. Keynote Address, McGraw Center for Educational Leadership
   Reimagining Education in the Age of AI
   University of Pennsylvania, Philadelphia, June 2023.
3. Invited Lecture, Association of Public & Land-Grant Universities
   The National Science Foundation AI Institute for Engaged Learning
   Chicago / Virtual Hybrid, July 2022.
4. Keynote Address, Empowering Learners for the Age of AI
   AI-Driven Narrative-Centered Learning Environments for K-12 Education
   Virtual, December 2021.
5. Keynote Address, AI in Learning – Shaping the Future
   AI and the Future of Education
   Virtual, November 2021.
6. Plenary Address, National Academy of Education
   AI-Driven Narrative-Centered Learning Environments to Enhance STEM Learning
   Virtual, November 2021.

7. Keynote Address, ACM International Conference on Multimedia
AI and the Future of Education
Chengdu, China / Virtual Hybrid, October 2021.

8. Invited Lecture, Indiana University
K-12 Education in the Age of AI
Virtual, March 2021.

9. Keynote Address, University of Florida Informatics Institute Annual Symposium
Intelligent Narrative-Centered Learning Environments
University of Florida, Gainesville, Florida, October 2019.

10. Invited Lecture, Serious Play
Narrative-Centered Learning Environments
George Mason University, Manassas, Virginia, July 2017.

11. Keynote Address, Third International Workshop on Intelligent Digital Games for Empowerment and Inclusion
Narrative-Centered Learning Environments
Held in conjunction with the Twentieth ACM Conference on Intelligent User Interfaces (IUI-2015)
Atlanta, March 2015.

12. Invited Lecture, ICT Workshop on Empirical Research with Pedagogical Agents
From Coaches to Creative Collaborators: Empathic Pedagogical Agents
University of Southern California, Institute for Creative Technologies, Playa Vista, California, October 2014.

13. Keynote Address, Third Workshop on Games and NLP (GAMNLP-2014)
Narrative-Centered Learning Environments
Raleigh, North Carolina, October 2014.

14. Keynote Address, Seventh International Conference on Natural Language Generation (INLG-2012)
Expressive NLG for Next-Generation Learning Environments: Language, Affect, and Narrative
Utica, Illinois, June 2012.

15. Keynote Address, Fourth International Conference on Affective Computing and Intelligent Interaction (ACII-2011)
Affect, Learning, and Delight
Memphis, Tennessee, October 2011.

16. Featured Speaker, Twelfth International Conference on College Teaching and Learning
Panel: *Best Practices in Online Learning*
Jacksonville, Florida, April 2001.

17. Keynote Address, Lifelike Computer Characters '98
Out of the Lab and into the World: Lifelike Computer Characters Go to School
Snowbird, Utah, October 1998.

18. Keynote Address, Ninth International Workshop on Natural Language Generation
Natural Language Generation Journeys to Interactive 3D Worlds
Niagara-on-the-Lake, Ontario, Canada, August 1998.

19. Invited Lecture, Fifteenth Twente Workshop on Language Technology: Interactions in Virtual Worlds
Natural Language Generation in Multimodal Learning Environments: Lifelike Agents and 3D Animated Explanation Generation
University of Twente, Enschede, The Netherlands, May 1999.

20. Invited Lecture, Imagina: The European Image Technology Event
Organized by Institut National de l'Audiovisuel and the Monte-Carlo Television Festival
Intelligent Virtual Teachers
Monaco, March 1998.

Colloquia

1. Stanford University
   The National Science Foundation AI Institute for Engaged Learning
   Co-presenter: J. Roschelle
   Virtual, May 2022.

2. Williams College
   Intelligent Narrative-Centered Learning Environments
   Williamstown, Massachusetts, April 2019.

3. East Carolina University
   Intelligent Narrative-Centered Learning Environments
   Greenville, North Carolina, February 2019.

4. RTI International
   Towards Intelligent Narrative-Centered Learning Environments
   Research Triangle Park, North Carolina, April 2018.

5. College of Charleston
   Intelligent Game-based Learning Environments
   Charleston, South Carolina, April 2016.

6. University of Florida
   Narrative-Centered Learning Environments
   Gainesville, Florida, October 2015.

7. Australian Council for Educational Research (ACER)
   Narrative-Centered Learning Environments
   Melbourne, Australia, April 2015.

8. University of Melbourne
   Narrative-Centered Learning Environments
   Melbourne, Australia, April 2015.

9. DePaul University
   Narrative-Centered Learning Environments
   Chicago, May 2014.

10. Columbia University
    Recognizing Students' Goals in Game-Based Learning Environments: A Markov Logic Approach
    Co-Presenter: J. Rowe
    New York, September 2013.

11. Texas A&M University
    Narrative-Centered Learning Environments
    College Station, November 2012.

12. IT University of Copenhagen
    Narrative-Centered Learning Environments
    Copenhagen, Denmark, August 2012.

13. The Concord Consortium
    Narrative-Centered Learning Environments
    Concord, MA, July 2012.

14. Arizona State University
    Narrative-Centered Learning Environments
    Tempe, Arizona, January 2012.

15. University of North Carolina at Charlotte
    Multimodal Intelligent Tutoring Systems
    Charlotte, January 2011.

16. University of North Carolina at Charlotte
Narrative-Centered Learning Environments
Charlotte, November 2010.

17. Carnegie Mellon University
Narrative-Centered Learning Environments
Pittsburgh, April 2010.

18. Carnegie Mellon University
Interdisciplinary Research in 7 (or a Few More) Easy Steps
Pittsburgh, April 2010.

19. University of Texas at Austin
Narrative-Centered Learning Environments
Austin, Texas, March 2010.

20. University of Rochester
Characters, Explanation & Story: Intelligent Media Systems and Narrative Generation for Knowledge-Based Learning Environments
Rochester, NY, November 2002.

21. University of Toronto
Computer Science Distinguished Colloquium Series
Intelligent Multimedia Systems for Knowledge-Based Learning Environments
Toronto, November 2000.

22. MITRE
Lifelike Pedagogical Agents and 3D Animated Explanation Generation for Learning Environments
Washington, DC, September 2000.

23. Northwestern University
Animated Pedagogical Agents and 3D Animated Explanation Generators for Next-Generation Knowledge-Based Learning Environments
Evanston, IL, May 1998.

24. University of Delaware
Animated Pedagogical Agents and 3D Animated Explanation Generators for Next-Generation Knowledge-Based Learning Environments
Newark, Delaware, May 1998.

25. MIT, The Media Laboratory
Learning Environments for the 21st Century: Lifelike Pedagogical Agents, Learner-Centered Virtual Cinematography, and 3D Animated Explanation Generation
Cambridge, MA, April 1998.

26. German Center for Artificial Intelligence Research (DFKI)
Realtime Generation of User- and Task-Sensitive 3D Cinematography & Animated Explanations
Saarbrücken, Germany, March 1998.

27. Information Sciences Institute, University of Southern California
Generating Natural Language Explanations from Large-Scale Knowledge Bases
Marina del Rey, California, May 1996.

28. Southern Methodist University
Generating Natural Language Explanations from Large-Scale Knowledge Bases
Dallas, January 1994.

29. Microelectronics and Computer Technology Corporation (MCC)
Knowledge-Based Natural Language Processing Group
Context-Sensitive Multi-Paragraph Discourse Planning with Large-Scale Knowledge Bases
Austin, March 1992.

30. University of Wyoming

KNIGHT: A Student-Sensitive Discourse Generator for Intelligent Tutoring Systems
Laramie, Wyoming, September 1991.

Other National and International Presentations

1. Empowering Learners for the Age of AI
   J. Lester (Panel Chair)
   Panel on the National Science Foundation AI Institute for Engaged Learning
   Virtual, 2022.

2. Center for Integrative Research in Computing and Learning Sciences – AI in Education Panel
   J. Lester (Panelist)
   Panel on AI and Student Learning
   Virtual, 2020.

3. Adolescent and Young Adult Research Network Strategy Convening
   J. Lester
   Using Innovative Technology to Promote Adolescent and Young Adult Health: Laying the Groundwork
   San Francisco, 2020.

4. Technology, Mind & Society (TMS-2019)
   J. Lester (Panelist).
   Panel on Reflections on Cyberlearning: Exploring Tensions in the Co-Evolution of Learning Technologies with Advances in Learning Theories and Methods
   Washington, DC, 2019.

5. Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC-2018)
   J. Lester (Panelist).
   Panel on AI Run Amok
   Orlando, Florida, 2018.

6. Science of Learning Symposium
   J. Lester (Panelist).
   Panel on Intelligent Learning Environments
   Brisbane, Australia, 2015.

7. NARST Symposium on Big Data and Learning Analytics
   J. Lester, E. Wiebe, and A. Smith.
   Towards Sketch-based Learning Analytics
   National Association for Research in Science Teaching, Chicago, 2015.

8. NSF DRK-12 PI Meeting Session on Navigating to NGSS Success: Identifying a Research Agenda
   J. Lester.
   The Leonardo Project: Scalable Modeling and Adaptive Guidance in an Intelligent Cyberlearning Environment for Upper-Elementary Science Education
   DRK-12 PI Meeting, Washington, 2014.

9. AERA Symposium on Using Educational Data Mining for Science Inquiry Skill Assessment and Prediction
   S. Leeman-Munk, E. Wiebe, and J. Lester.
   Mining Student Science Argumentation Text to Inform an Intelligent Tutoring System
   American Educational Research Association, San Francisco, 2013.

10. AERA
    J. Nietfeld, J. Minogue, H. Spires, and J. Lester.
    Girls and Games: Examining the Performance and Self-Regulation of Girls in a Science Gaming Environment
    American Educational Research Association, San Francisco, 2013.

11. NCSA Session on So Deeply Embedded, 'Assessment" Disappears: A Report from Two Next Generation Learning Challenge Winners
N. Heffernan, J. Rowe, B. Delaney, C. Heffernan, and J. Lester.
The Crystal Island: Lost Investigation Project
National Conference on Student Assessment, Minneapolis, 2012.

12. AERA Symposium on Advances in Assessing Game-Based Learning
J. Lester, J. Minogue, J. Nietfeld, and H. Spires.
Tracing the Design and Testing of a Game-Based Learning Environment for Upper Elementary Students
American Educational Research Association, Vancouver, 2012.

13. AERA Symposium on Measuring Self-Regulated Learning With Multi-Agent Learning Environments
J. Sabourin and J. Lester.
Self-Regulated Learning in Exploratory Game-Based Learning Environment
American Educational Research Association, Vancouver, 2012.

14. AERA Symposium on Knowing What Students Know and Feel: Innovative Technology-Rich Assessments
J. Rowe, J. Sabourin, and J. Lester.
Affect and Off-Task Behavior in Narrative-Centered Learning Environments
American Educational Research Association, Vancouver, 2012.

15. Cyberlearning Research Summit
Learning and Engagement in Narrative-Centered Learning Environments
National Geographic Society, Washington, D.C., 2012.
CADRE Gaming SIG
Developing Science Problem-solving Skills and Engagement through Intelligent Game-based Learning Environments
Education Development Center, Washington, D.C., 2011.

16. AERA Symposium on Middle-Grades Student Achievement, Engagement, and Experience
H. Spires, L. Hervey, J. Rowe, B. Mott, and J. Lester.
Do Think-Aloud Protocols (TAPs) Lead to Higher Levels of Writing Self-efficacy and Achievement When Sixth Graders Use a Narrative-Centered Learning Environment?
American Educational Research Association, Denver, 2010.

17. AERA Symposium on Affect-Sensitive Learning Technologies
J. Lester, J. Robison, and J. Rowe.
Modeling and Supporting Student Affect in Game-Based Learning Environments
American Educational Research Association, Denver, 2010.

18. AERA Symposium on Recent Advances in the Design of Games That Support Learning
H. Spires, L. Hervey, J. Rowe, B. Mott, and J. Lester.
Effects of Game-Based Performance on Science Learning: A Transactional Theoretical Perspective
American Educational Research Association, Denver, 2010.

19. AERA Symposium on Understanding the Complex Nature of Self-Regulatory Processes During Learning with Computer-Based Learning Environments
J. Lester, S. McQuiggan, J. Nietfeld, K. Hoffmann, J. Robison, H. Spires.
Modeling Metacognitive Monitoring in Narrative-Centered Learning Environments
American Educational Research Association, San Diego, 2009.

20. AERA Symposium on Student Engagement in Middle Grades
H. Spires, L. Hervey, T. Watson, and J. Lester.
Middle Grades Students and Game-Based Learning: Creativity, Engagement, and Writing Achievement
American Educational Research Association, San Diego, 2009.

21. AERA Symposium on Motivation, Affect, and Engagement in Game-Based Learning Environments

J. Lester and S. McQuiggan.
Affect and Motivation in Narrative-Centered Learning Environments
American Educational Research Association, New York, 2008.

22. AERA Symposium on Intelligent Tutoring Systems: What Do We Do Next?
S. McQuiggan and J. Lester.
Motivating Students in the Frustration Window
American Educational Research Association, New York, 2008.

23. AERA Symposium on Animated Pedagogical Agents
J. Lester and P. FitzGerald.
Designing Animated Pedagogical Agents: Foundational Technologies and Theoretical Constructs
American Educational Research Association, New Orleans, 2000.

24. Plenary Session Address, AAAI 2000 Spring Symposium Smart Graphics
Stanford University, March 2000.

25. U.S. Department of Labor Joint Employment & Training Technology Conference
J. Lester and P. FitzGerald.
Animated Pedagogical Agents
Washington, DC, 1996.

26. NIST Workshop on Education and Training Technology
J. Lester and P. FitzGerald.
Animated Pedagogical Agents: The Next Generation of Intelligent Educational Technology
National Institute of Standards and Technology
Washington, DC, 1996.

Courses Taught

Undergraduate Courses

- Introduction to Programming (CSC116): Fall 2005, Spring 2006, Spring 2007, Spring 2008.
- Programming Concepts (CSC210): Fall 1996.
- Data Structures for Computer Scientists (CSC316): Fall 2004, Spring 2006.
- Introduction to Artificial Intelligence (CSC411): Spring 1997, Spring 1999, Spring 2004, Summer 2006, Summer 2007.
- Intelligent Game-Based Learning Environments (CSC495): Spring 2013, Spring 2014, Spring 2016.

Graduate Courses

- Artificial Intelligence I (CSC520): Fall 1994, Fall 1995, Fall 1997, Fall 1998, Fall 1999, Fall 2005, Fall 2006, Fall 2007, Fall 2009.
- Multimedia Interface Design (CSC591D): Fall 1995.
- Knowledge-Based Learning Environments (CSC591E): Fall 1995, Fall 1996.
- Intelligent Game-Based Learning Environments (CSC591): Fall 2010, Spring 2013, Spring 2014, Spring 2016.
- Intelligent Multimedia Systems (CSC725): Fall 1994, Spring 1998, Spring 2001, Spring 2005.
- Natural Language Processing (CSC791T): Fall 2006, Fall 2008.
- Natural Language Dialogue Systems (CSC791J): Fall 2007.

Professional Service

Editorial Leadership

- Associate Editor, *International Journal of Artificial Intelligence in Education*, 2016-present.
- Guest Editor, *International Journal of Artificial Intelligence and Education*, 33(2), Special Issue on K-12 AI Education, with N. Wang, 2023.
- Guest Editor, *International Journal of Artificial Intelligence in Education*, 28(2), Special Issue on the Generalized Intelligent Framework for Tutoring (GIFT), with R. Sottilare, R. Baker, and A. Graesser, 2018.
- Associate Editor, *IEEE Transactions on Affective Computing*, 2014-19.
- Editor-in-Chief, *International Journal of Artificial Intelligence in Education*, 2009-12.
- Guest Editor, *International Journal of Artificial Intelligence in Education*, 16(2), Special Issue on Best of ITS 2004, with R. Vicari and F. Paraguçu, 2006.
- Guest Editor, *AI Magazine*, Special Issue on Intelligent User Interfaces, Winter 2001.

Editorial Boards

- *International Journal of STEM Education*, 2014-present.
- *Metacognition and Learning*, 2012-2019.
- *Autonomous Agents and Multi-Agent Systems*, 1999-2007.

Steering and Executive Committees

- Steering Committee, *IEEE Transactions on Transactions on Learning Technologies*, 2015-18.
- Steering Committee, *IEEE Transactions on Transactions on Affective Computing*, 2009-12.
- Executive Committee, HUMAINE Association for Affective Computing, 2007-09.
- Steering Committee, International Conference on Intelligent Tutoring Systems, 2004-present.

Conference and Program Committees Chair

- Co-Chair, Cyberlearning, 2019.
- Program Chair, International Conference on Foundations of Digital Games (FDG-2013), 2013.
- Program Co-Chair, International Conference on Interactive Digital Storytelling (ICIDS-2011), 2011.
- Conference Co-Chair, International Conference on Intelligent Virtual Agents (IVA-2008), 2008.
- Program Chair, International Conference on Intelligent Tutoring Systems (ITS-2004), 2004.
- Program Chair, International Conference on Intelligent User Interfaces (IUI-2001), 2001.

Conference Special Tracks Chair

- Co-Chair, Cognitive Systems Track, Thirtieth AAAI Conference on Artificial Intelligence (AAAI-2016), 2016.
- Chair, Virtual Agents Track, Tenth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2011), 2011.

Conference Area Chair

- Area Chair, Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI-2020), 2020.

Proceedings Edited

- Editor (with M. Si, D. Thue, E. André, J. Tanenbaum, and V. Zammitto), *Interactive Storytelling: Fourth International Conference on Interactive Digital Storytelling, ICIDS 2011*, Springer, LNCS 7069, 2011.
- Editor (with H. Prendinger and M. Ishizuka), *Intelligent Virtual Agents: Eighth International Conference*, IVA 2008, Springer-Verlag, LNCS 5208, 2008.
- Editor (with R. Vicari and F. Paraguaçu), *Intelligent Tutoring Systems*, Springer-Verlag, LNCS 3220, 2004.

Elected Office

- ACM Special Interest Group on Artificial Intelligence (SIGART) Secretary-Treasurer, 1997-1999.

Conference Organizing Committees

- Interactive Media Strand Co-Leader, Annual Conference for NIH Science Education Projects (SciEd-2022), Washington, 2022.
- Awards Co-Chair, Nineteenth International Conference on Artificial Intelligence in Education (AIED-2018), London, 2018.
- Treasurer, First International Conference on Autonomous Agents (Agents-1997), Marina del Rey, California, 1997.

Symposia, Workshops, and Expert Panels Chaired

- Co-Chair: AIED-2023 Workshop on AI Education in K-12
  Venue: Tokyo/Virtual, 2023.
- Co-Chair: NSF Workshop 3 on AI-K12
  Workshop: Workshop on AI Education for K-12.
  Venue: Virtual, 2021.
- Co-Chair: NSF Workshop 2 on AI-K12
  Workshop: Workshop on AI Education for K-12.
  Venue: Virtual, 2021.
- Co-Chair, Digital Promise Expert Panel on AI & the Future of Learning, 2020.
  Sponsor: Center for Innovative Research in Cyberlearning (CIRCL).
  Venue: Virtual, 2020.
- Co-Chair: NSF Workshop 1 on AI-K12
  Workshop: Workshop on AI Education for K-12.
  Venue: Los Angeles, 2019.
- Co-Chair, AIED-2019 Workshop on AI Education in K-12.
  Venue: Chicago, 2019.
- Co-Chair, AIED-09 Workshop on Question Generation.
  Venue: Brighton, UK, 2009.
- Co-Chair, AIED-97 Workshop on Pedagogical Agents.

Venue: Kobe, Japan, 1997.

Conference Program Committee Member

- Program Committee: Seventeenth International Conference on Educational Data Mining (EDM-2024), Atlanta, 2024.
- Senior Program Committee: Twenty-Fifth International Conference on Artificial Intelligence in Education (AIED-2024), Recife, Brazil, 2024.
- Program Committee: Thirty-Second ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2024), Sardinia, Italy, 2024.
- Program Committee: Fourteenth International Learning Analytics & Knowledge Conference (LAK-2024), Kyoto, Japan, 2024.
- Program Committee: Nineteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2023), Salt Lake City, Utah, 2023.
- Program Committee: Sixteenth International Conference on Educational Data Mining (EDM-2023), Bengaluru, India, 2023.
- Senior Program Committee: Twenty-Fourth International Conference on Artificial Intelligence in Education (AIED-2023), Tokyo, 2023.
- Program Committee: Thirteenth International Learning Analytics & Knowledge Conference (LAK-2023), Arlington, Texas, 2023.
- Program Committee: Eighteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2022), Pomona, California, 2022.
- Program Committee: Twenty-Second ACM International Conference on Intelligent Virtual Agents (IVA-2022), Faro, Portugal, 2022.
- Senior Program Committee: Twenty-Third International Conference on Artificial Intelligence in Education (AIED-2022), Durham, United Kingdom, 2022.
- Senior Program Committee: Fifteenth International Conference on Educational Data Mining (EDM-2022), Durham, United Kingdom, 2022.
- Program Committee: Thirtieth ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2022), Barcelona/Hybrid, 2022.
- Program Committee: Twelfth International Learning Analytics & Knowledge Conference (LAK-2022), Virtual, 2022.
- Program Committee: Ninth Annual Conference on Advances in Cognitive Systems (ACS-2021), Virtual, 2021.
- Program Committee: Fourteenth International Conference on Interactive Digital Storytelling (ICIDS-2021), Virtual, 2021.
- Program Committee: Seventeenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2021), Virtual, 2021.
- Program Committee: IEEE Conference on Games (CoG-2021), Virtual, 2021.
- Program Committee: Twenty-Ninth ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2021), Virtual, 2021.
- Senior Program Committee: Twenty-Second International Conference on Artificial Intelligence in Education (AIED-2021), Virtual, 2021.
- Program Committee: Eleventh International Learning Analytics & Knowledge Conference

(LAK-2021), Virtual, 2021.

- Program Committee: Twentieth ACM International Conference on Intelligent Virtual Agents (IVA-2020), Virtual, 2020.
- Program Committee: Sixteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2020), Worcester, Massachusetts, 2020.
- Program Committee: Twenty-Eight ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2020), Genoa, Italy, 2020.
- Senior Program Committee: Thirteenth International Conference on Educational Data Mining (EDM-2020), Ifrane, Moroco, 2020.
- Program Committee: Twenty-First International Conference on Artificial Intelligence in Education (AIED-2020), Ifrane, Moroco, 2020.
- Program Committee: Tenth International Learning Analytics & Knowledge Conference (LAK-2020), Frankfurt, 2020.
- Program Committee: Twelfth International Conference on Interactive Digital Storytelling (ICIDS-2019), Snowbird, Utah, 2019.
- Program Committee: Fifteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2019), Atlanta, 2019.
- Program Committee: Seventh Annual Conference on Advances in Cognitive Systems (ACS-2019), Cambridge, Massachusetts, 2019.
- Program Committee: Fifty-Seventh Annual Meeting of the Association for Computational Linguistics (ACL-2019), Florence, 2019.
- Senior Program Committee: Nineteenth ACM International Conference on Intelligent Virtual Agents (IVA-2019), Paris, 2019.
- Program Committee: Twenty-Seventh ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2019), Larnaca, Cyprus, 2019.
- Senior Program Committee: Fifteenth International Conference on Intelligent Tutoring Systems (ITS-2019), Kingston, Jamaica, 2019.
- Program Committee: Second IEEE International Conference on Artificial Intelligence and Virtual Reality (AVIR-2019), Osaka, 2019.
- Program Committee: Ninth International Learning Analytics & Knowledge Conference (LAK-2019), Tempe, Arizona, 2019.
- Program Committee: Eleventh International Conference on Interactive Digital Storytelling (ICIDS-2018), Dublin, 2018.
- Program Committee: Fourteenth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2018), Edmonton, 2018.
- Senior Program Committee: Eighteenth International Conference on Intelligent Virtual Agents (IVA-2018), Sydney, 2018.
- Program Committee: Twenty-Seventh International Conference on Computational Linguistics (COLING-2018), Santa Fe, 2018.
- Program Committee: IEEE Conference on Computational Intelligence and Games (CIG-2018), Maastricht, 2018.
- Senior Program Committee: Eleventh International Conference on Educational Data Mining (EDM-2018), Buffalo, New York, 2018.

- Senior Program Committee: Twenty-Seventh International Joint Conference on Artificial Intelligence (IJCAI-2018), Stockholm, 2018.
- Program Committee: Nineteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2018), Melbourne, 2018.
- Program Committee: 2018 International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2018), Stockholm, 2018.
- Program Committee: Twenty-Sixth ACM Conference on User Modeling, Adaptation, and Personalization (UMAP-2018), Singapore, 2018.
- Program Committee: Nineteenth International Conference on Artificial Intelligence in Education (AIED-2018), London, 2018.
- Senior Program Committee: Fourteenth International Conference on Intelligent Tutoring Systems (ITS-2018), Montreal, 2018.
- Program Committee: Sixteenth Annual Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT-2018), New Orleans, 2018.
- Program Committee: Technology, Mind & Society (TMS-2018), Washington, 2018.
- Program Committee: Thirteenth IEEE Conference on Automatic Face and Gesture Recognition (FG-2018), Xi'an, China, 2018.
- Program Committee: Eighth International Learning Analytics & Knowledge Conference (LAK-2018), Sydney, 2018.
- Program Committee: Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-2018), New Orleans, 2018.
- Program Committee: Tenth International Conference on Interactive Digital Storytelling (ICIDS-2017), Funchal, Madeira, Portugal, 2017.
- Program Committee: Thirteenth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2017), Snowbird, Utah, 2017.
- Program Committee: International Conference on Affective Computing and Intelligent Interaction (ACII-2017), San Antonio, 2017.
- Senior Program Committee: Seventeenth International Conference on Intelligent Virtual Agents (IVA-2017), Stockholm, 2017.
- Senior Program Committee: Twenty-Sixth International Joint Conference on Artificial Intelligence (IJCAI-2017), Melbourne, 2017.
- Program Committee: Eighteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2017), Saarbrücken, Germany, 2017.
- Program Committee: Twenty-Fifth Conference on User Modeling, Adaptation, and Personalization (UMAP-2017), Bratislava, Slovakia, 2017.
- Senior Program Committee: Eighteenth International Conference on Artificial Intelligence in Education (AIED-2017), Wuhan, China, 2017.
- Senior Program Committee: Tenth International Conference on Educational Data Mining (EDM-2017), Wuhan, China, 2017.
- Program Committee: Twelfth IEEE Conference on Automatic Face and Gesture Recognition (FG-2017), Washington, 2017.
- Program Committee: Fifth Annual Conference on Advances in Cognitive Systems (ACS-2017), Troy, New York, 2017.

- Program Committee: Seventh International Learning Analytics & Knowledge Conference (LAK-2017), Vancouver, 2017.
- Program Committee: Ninth International Conference on Interactive Digital Storytelling (ICIDS-2016), Los Angeles, 2016.
- Program Committee: Twelfth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2016), San Francisco, 2016.
- Program Committee: Seventeenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2016), Los Angeles, 2016.
- Program Committee: Fourth Annual Conference on Advances in Cognitive Systems (ACS-2016), Chicago, 2015.
- Senior Program Committee: Sixteenth International Conference on Intelligent Virtual Agents (IVA-2016), Los Angeles, 2016.
- Program Committee: Twenty-Fourth Conference on User Modeling, Adaptation, and Personalization (UMAP-2016), Halifax, 2016.
- Program Committee: Twenty-Fifth International Joint Conference on Artificial Intelligence (IIJCAI-2016), New York, 2016.
- Program Committee: Ninth International Conference on Educational Data Mining (EDM-2016), Raleigh, North Carolina, 2016.
- Senior Program Committee: Thirteenth International Conference on Intelligent Tutoring Systems (ITS-2016), Zagreb, Croatia, 2016.
- Senior Program Committee: 2016 International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2016), Singapore, 2016.
- Program Committee: Eleventh Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2015), Santa Cruz, California, 2015.
- Program Committee: Eighth International Conference on Knowledge Capture (K-CAP-2015), Palisades, New York, 2015.
- Program Committee: Sixteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2015), Prague, 2015.
- Program Committee: Third Annual Conference on Advances in Cognitive Systems (ACS-2015), Atlanta, 2015.
- Senior Program Committee: Fifteenth International Conference on Intelligent Virtual Agents (IVA-2015), Delft, The Netherlands, 2015.
- Program Committee: Tenth International Conference on the Foundations of Digital Games (FDG-2015), Pacific Grove, California, 2015.
- Program Committee: Fifty-Third Annual Meeting of the Association for Computational Linguistics (ACL-2015) and the Seventh International Joint Conference on Natural Language Processing, Beijing, 2015.
- Program Committee: Twenty-Third Conference on User Modeling, Adaptation, and Personalization (UMAP-2015), Dublin, 2015.
- Senior Program Committee: Seventeenth International Conference on Artificial Intelligence in Education (AIED-2015), Madrid, 2015.
- Program Committee: Third Annual Conference on Advances in Cognitive Systems (ACS-2015), Atlanta, 2015.

- Program Committee: Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI-2015), Austin, 2015.
- Program Committee: Tenth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2014), Raleigh, North Carolina, 2014.
- Senior Program Committee: Fourteenth International Conference on Intelligent Virtual Agents (IVA-2014), Boston, 2014.
- Program Committee: Twenty-Eighth AAAI Conference on Artificial Intelligence (AAAI-2014), Québec City, Québec, Canada, 2014.
- Program Committee: Twenty-Second Conference on User Modeling, Adaptation and Personalization (UMAP-2014), Aalborg, Denmark, 2014.
- Program Committee: Fifteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2014), Philadelphia, 2014.
- Senior Program Committee: Twelfth International Conference on Intelligent Tutoring Systems (ITS-2014), Honolulu, Hawaii, 2014.
- Program Committee: Ninth International Conference on the Foundations of Digital Games (FDG-2014), Fort Lauderdale, Florida, 2014.
- Program Committee: Ninth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2013), Boston, 2013.
- Program Committee: Fifth International Conference on Affective Computing and Intelligent Interaction (ACII-2013), Geneva, Switzerland, 2013.
- Senior Program Committee: Sixteenth International Conference on Artificial Intelligence in Education (AIED-2013), Memphis, 2013.
- Program Committee: Seventh International Conference on Knowledge Capture (K-CAP-2013), Banff, 2013.
- Program Committee: Twenty-First Conference on User Modeling, Adaptation and Personalization (UMAP-2013), Rome, 2013.
- Senior Program Committee: Twelfth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2013), St. Paul, Minnesota, 2013.
- Program Committee: Eighth Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2012), Stanford, 2012.
- Senior Program Committee: Twelfth International Conference on Intelligent Virtual Agents (IVA-2012), Santa Cruz, 2012.
- Program Committee: Thirteenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2012), Seoul, 2012.
- Program Committee: Fiftieth Annual Meeting of the Association for Computational Linguistics (ACL-2012), Jeju, South Korea, 2012.
- Program Committee: Twentieth Conference on User Modeling, Adaptation and Personalization (UMAP-2012), Montreal, 2012.
- Senior Program Committee: Eleventh International Conference on Intelligent Tutoring Systems (ITS 2012), Crete, 2012.
- Program Committee: 2012 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT 2012), Montreal, 2012.
- Senior Program Committee: Eleventh International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2012), Valencia, 2012.

- Program Committee: Fourth IEEE International Conference on Digital Game and Intelligent Toy Enhanced Learning (DIGITEL-2012), Kagawa, Japan, 2012.
- Associate Chair: 2012 ACM International Conference on Intelligent User Interfaces (IUI-2012), Lisbon, 2012.
- Program Committee: Seventh Annual Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-2011), Stanford, 2011.
- Program Committee: Eleventh International Conference on Intelligent Virtual Agents (IVA-2011), Reykjavik, Iceland, 2011.
- Program Committee: International Conference on Affective Computing and Intelligent Interaction (ACII-2011), Memphis, 2011.
- Program Committee: Twenty-Fifth AAAI Conference on Artificial Intelligence (AAAI-2011), San Francisco, 2011.
- Senior Program Committee: Fifteenth International Conference on Artificial Intelligence in Education (AIED-2011), Auckland, New Zealand, 2011.
- Program Committee: Forty-Ninth Annual Meeting of the Association for Computational Linguistics: Human Language Technologies (ACL-HLT-2011), Portland, Oregon, 2011.
- Program Committee: Nineteenth Conference on User Modeling, Adaptation and Personalization (UMAP-2011), Girona, Spain, 2011.
- Program Committee: Sixth International Conference on Knowledge Capture (K-CAP-2011), Banff, 2011.
- Program Committee: International Conference on Intelligent User Interfaces (IUI-2011), Palo Alto, 2011.
- Program Committee: Conference on Empirical Methods in Natural Language Processing (EMNLP-2010), Boston, 2010.
- Senior Program Committee: Tenth International Conference on Intelligent Tutoring Systems (ITS-2010), Pittsburgh, 2010.
- Senior Program Committee: Ninth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2010), Special Track on Virtual Agents, Toronto, 2010.
- Program Committee: Twenty-Fourth AAAI Conference on Artificial Intelligence (AAAI-2010), Atlanta, 2010.
- Program Committee: 2010 International Conference on Intelligent User Interfaces (IUI-2010), Hong Kong, 2010.
- Program Committee: Tenth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2010), Tokyo, 2010.
- Program Committee: Tenth International Conference on Intelligent Virtual Agents (IVA-2010), Philadelphia, 2010.
- Program Committee: Eighteenth Conference on User Modeling, Adaptation and Personalization (UMAP-2010), Hawaii, 2010.
- Program Committee: Sixth International Conference on Natural Language Generation (INLG-10), Trim, Ireland, 2010.
- Program Committee: Fifth International Conference on Knowledge Capture (K-CAP-2009), Redondo Beach, California, 2009.
- Program Committee: Twenty-First International Joint Conference on Artificial Intelligence (IIJCAI-2009), Pasadena, California, 2009.

- Program Committee: Eighth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2009), Budapest, Hungary, 2009.
- Program Committee: Ninth International Conference on Intelligent Virtual Agents (IVA-2009), Amsterdam, 2009.
- Program Committee: First IEEE International Conference on Games and Virtual Worlds for Serious Applications (VS-GAMES-2009), Coventry, UK, 2009
- Program Committee: Seventeenth International Conference on Computers in Education, ICCE Conference on AIED/ITS & Adaptive Learning (ICCE AIED/ITS-2009), Hong Kong, 2009.
- Program Committee: 2009 International Conference on Intelligent User Interfaces (IUI-2009), Sanibel Island, Florida, 2009.
- Program Committee: Ninth Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL-2009), London, 2009.
- Senior Program Committee: Ninth International Conference on Intelligent Tutoring Systems (ITS-2008), Montreal, 2008.
- Program Committee: Seventh International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2008), Virtual Agents Special Track, Estoril, Portugal, 2008.
- Senior Program Committee: Sixteenth International Conference on Computers in Education, ICCE Conference on AIED/ITS & Adaptive Learning (ICCE AIED/ITS-2008), Tapei, Taiwan, 2008.
- Program Committee: Second IEEE International Conference on Digital Games and Intelligent Toys Based Education (DIGITEL-2008), Banff, Alberta, 2008.
- Program Committee: Fifth International Conference on Natural Language Generation (INLG-08), Salt Fork State Park, Ohio, 2008.
- Senior Program Committee: Twenty-Second AAAI Conference on Artificial Intelligence (AAAI-2007), Vancouver, 2007.
- Program Committee: Sixth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2007), Honolulu, 2007.
- Program Committee: Seventh International Conference on Intelligent Virtual Agents (IVA-2007), Paris, 2007.
- Program Committee: Thirteenth International Conference on Artificial Intelligence in Education (AIED-2007), Marina del Rey, CA, 2007.
- Program Committee: 2007 International Conference on Intelligent User Interfaces (AIED-2007), Honolulu, 2007.
- Senior Program Committee: Twenty-First National Conference on Artificial Intelligence (AAAI-2006) Boston, 2006.
- Program Committee & Meta-Reviewer: 2006 International Conference on Intelligent User Interfaces (IUI-2006), Sydney, 2006.
- Program Committee: Sixth International Conference on Intelligent Virtual Agents (IVA-2006), Marina del Rey, CA, 2006.
- Program Committee: Fifth International Conference on Entertainment Computing (ICEC-2006), Cambridge, England, 2006.
- Program Committee: Second International Conference on Narrative and Interactive Learning Environments (NILE-2006), Edinburgh, 2006.
- Program Committee: Fifth Joint Conference on Autonomous Agents & Multiagent Systems (AAMAS-2006), Hakodate, Japan, 2006.

- Program Committee: 2005 International Conference on Intelligent User Interfaces (IUI-2005), San Diego, 2005.
- Program Committee: Fifth International Working Conference on Intelligent Virtual Agents (IVA-2005), Kos, Greece, 2005.
- Program Committee: Eighteenth International Conference on Computer Animation and Social Agents (CASA-2005), Hong Kong, 2005.
- Program Committee: Twelfth International Conference on Artificial Intelligence in Education (AIED-2005), Amsterdam, 2005.
- Senior Program Committee: Nineteenth National Conference on Artificial Intelligence (AAAI-2004), San Jose, 2004.
- Program Committee: 2004 International Conference on Intelligent User Interfaces (IUI-2004), Madeira, Portugal, 2004.
- Program Committee: Seventeenth International Conference on Computer Animation and Social Agents (CASA-2004), Geneva, Switzerland, 2004.
- Program Committee: Third International Conference on Entertainment Computing (ICEC-2004), Eindhoven, The Netherlands, 2004.
- Program Committee: Fourth International Conference on Computational Semiotics for Games and New Media (COSIGN-2004), Split, Croatia, 2004.
- Program Committee: Second International Joint Conference on Autonomous Agents & Multiagent Systems (AAMAS-2003), Melbourne, Australia, 2003.
- Program Committee: 2003 International Conference on Intelligent User Interfaces (IUI-2003), Miami, 2003.
- Program Committee: Third International Conference on Computational Semiotics for Games and New Media (COSIGN-2003), Middlesbrough, UK, 2003.
- Program Committee: International Conference of Computers in Education (ICCE-2003), Hong Kong, 2003.
- Program Committee: 2002 International Conference on Intelligent User Interfaces (IUI-2002), San Francisco, 2002.
- Program Committee: First International Joint Conference on Autonomous Agents & Multiagent Systems (AAMAS-2002), Bologna, Italy, 2002.
- Program Committee: Sixth International Conference on Intelligent Tutoring Systems (ITS-2002), Biarritz, France, 2002.
- Program Committee: Second International Conference on Computational Semiotics for Games and New Media (COSIGN-2002), Augsburg, Germany, 2002.
- Senior Program Committee: Fifth International Conference on Autonomous Agents (Agents-2001), Montreal, 2001.
- Program Committee: Joint International Conference on Computers in Education and International Conference on Computer-Assisted Instruction (ICCE/ICCAI-2000), Taipei, Taiwan, 2000.
- Senior Program Committee: Seventeenth National Conference on Artificial Intelligence (AAAI-2000), Austin, 2000.
- Program Committee: Fourth International Conference on Autonomous Agents (Agents-2000), Barcelona, Spain, 2000.
- Program Committee: International Conference on Natural Language Generation (INLG-2000), Mitzpe Ramon, Israel, 2000.

- Program Committee: Fifth International Conference on Intelligent Tutoring Systems (ITS-2000), Montreal, 2000.
- Program Committee: Third International Conference on Autonomous Agents (Agents-1999), Seattle, 1999.
- Program Committee: International Conference on Intelligent User Interfaces (IUI-99), Los Angeles, 1999.
- Program Committee & Organizing Committee: International Conference on Intelligent User Interfaces (IUI-98), San Francisco, 1998.
- Program Committee: Fifteenth National Conference on Artificial Intelligence (AAAI-98), Madison, Wisconsin, 1998.
- Program Committee: Autonomous Second International Conference on Autonomous Agents (Agents-1998), Minneapolis, 1998.
- Program Committee: Fourteenth National Conference on Artificial Intelligence (AAAI-1997), Providence, Rhode Island, 1997.

Symposium and Workshop Program Committee Member

- Program Committee: AAAI Fall Symposium on Cognitive Systems for Anticipatory Thinking, Arlington, Virginia, November 2019.
- Program Committee: EDM-2019 Workshop on EDM & Games: Leveling Up Engaged Learning with Data-Rich Analytics, Montreal, 2019.
- Program Committee: Joint Workshop on Intelligent Narrative Technologies and Intelligent Cinematography and Editing, Edmonton, Canada, 2018.
- Program Committee: Workshop on Intelligent Conversation Agents in Home and Geriatric Care Applications, Stockholm, 2018.
- Program Committee: Thirteenth Workshop on Innovative User of NLP for Building Educational Applications, New Orleans, 2018.
- Program Committee: CHI-2018 Workshop on Data-Driven Educational Game Design, Montreal, 2018.
- Program Committee: Tenth Workshop on Intelligent Narrative Technologies (INT10), Snowbird, Utah, 2017.
- Program Committee: Twelfth Workshop on Innovative User of NLP for Building Educational Applications, Copenhagen, 2017.
- Program Committee: Eleventh Workshop on Innovative Use of NLP for Building Educational Applications, San Diego, 2016.
- Program Committee: ITS-2016 Workshop on Supporting Dynamic Cognitive, Affective, and Metacognitive Processes, Zagreb, Croatia, 2016.
- Program Committee: ITS-2016 Workshop on Affect, Meta-Affect, Data, and Learning, Zagreb, Croatia, 2016.
- Program Committee: ITS-2016 Workshop on Workshop on Intelligent Support for Learning in Groups, Zagreb, Croatia, 2016.
- Program Committee: First International Workshop on Educational Robotics (WONDER-2015), Paris, 2015.
- Program Committee: Eighth Workshop on Intelligent Narrative Technologies (INT8), Santa Cruz, California, 2015.

- Program Committee: AIED-2015 Workshop on Should AI Stay Married to ED?", Madrid, 2015.
- Program Committee: AIED-2015 Workshop on Intelligent Support for Learning in Groups, Madrid, 2015.
- Program Committee: Tenth Workshop on Innovative Use of NLP for Building Educational Applications, Denver, 2015.
- Program Committee: IEEE FG-2015 International Workshop on Context-Based Affect Recognition (CBAR-2015), Ljubljiana, Slovenia, 2015.
- Program Committee: Third Workshop on Games and NLP (GAMNLP-2014), Raleigh, North Carolina, 2014.
- Program Committee: IVA-2014 Workshop on Affective Agents, Boston, 2014.
- Program Committee: Seventh Workshop on Intelligent Narrative Technologies (INT7), Milwaukee, Wisconsin, 2014.
- Program Committee: ITS-2014 Workshop on Intelligent Support for Learning in Groups, Honolulu, Hawaii, 2014.
- Program Committee: ITS-2014 Workshop on AI-supported Education for Computer Science, Honolulu, Hawaii, 2014.
- Program Committee: Second Workshop on Games and NLP (GAMNLP-2013), Boston, 2013.
- Program Committee: Sixth Workshop on Intelligent Narrative Technologies (INT6), Boston, 2012.
- Program Committee: AIED-2013 Workshop on Scaffolding in Open-Ended Learning Environments, Memphis, 2013.
- Program Committee: AIED-2013 Workshop on Simulated Learners, Memphis, 2013.
- Program Committee: AIED-2013 GIFT Workshop on Recommendations for Authoring, Instructional Strategies and Analysis for Intelligent Tutoring Systems (ITS): Toward the Development of a Generalized Intelligent Framework for Tutoring (GIFT), Memphis, 2013.
- Program Committee: AIED-2013 Workshop on Self-Regulated Learning in Educational Technologies: Supporting, Modeling, Evaluating, and Fostering Metacognition with Computer-based Learning Environments, Memphis, 2013.
- Program Committee: AIED-2013 Workshop on AI-supported Education for Computer Science, Memphis, 2013.
- Program Committee: AIIDE-2013 Workshop on AI for Serious Games, Stanford, 2012.
- Program Committee: Fifth Workshop on Intelligent Narrative Technologies (INT5), Stanford, 2012.
- Program Committee: ITS-2012 Workshop on Self-Regulated Learning in Educational Technologies, Crete, 2012.
- Program Committee: ITS-2012 Workshop on Intelligent Support for Learning in Groups, Crete, 2012.
- Program Committee: ITS-2012 Workshop on Emotion in Games for Learning, Crete, 2012.
- Program Committee: NAACL-HLT Workshop on Computational Linguistics for Literature, Montreal, 2012.
- Program Committee: AAMAS-2012 Workshop on Emotional and Empathetic Agents Workshop, Valencia, 2012.
- Program Committee: EC-TEL Workshop on Technology-Enhanced Learning for Math and Science, Palermo, Italy, 2011.

- Program Committee: Thirteenth European Workshop on Natural Language Generation (ENLG-2011), Nancy, France, 2011.
- Program Committee: Fourth Workshop on Intelligent Narrative Technologies (INT4), Stanford, 2011.
- Organizing Committee: AAAI Fall Symposium on Question Generation, Washington, D.C., 2011.
- Organizing Committee: AAAI Fall Symposium on Cognitive and Metacognitive Educational Systems, Washington, D.C., 2010.
- Steering Committee: ITS-2010 Workshop on Question Generation, Pittsburgh, PA, 2010.
- Program Committee: FDG-2010 Workshop on Intelligent Narrative Technologies, Monterey, California, 2010.
- Program Committee: MOG-2010 Workshop on Multimodal Output Generation, Dublin, 2010.
- Organizing Committee: AAAI Fall Symposium on Cognitive and Metacognitive Educational Systems, Washington, D.C., 2009.
- Program Committee: AIED 2009 Workshop on Closing the Affective Loop, Brighton, UK, 2009.
- Program Committee: AIED 2009 Workshop on Educational Games, Brighton, UK, 2009.
- Organizing Committee: NSF Workshop on the Question Generation Shared Task and Evaluation Challenge, Arlington, Virginia, 2008.
- Program Committee: AAAI Spring Symposium on Narrative Technologies II, Stanford, 2008.
- Program Committee: ECAI 2008 Workshop on Integrating Embodied Conversational Agents with Speech and Advanced Dialogue Modeling, Patras, Greece, 2008.
- Program Committee: ITS 2008 Workshop on Emotional and Cognitive Issues in ITS, Montreal, 2008.
- Program Committee: AAAI Fall Symposium on Intelligent Narrative Technologies, Arlington, Virginia, November 2007.
- Program Committee: AAAI 2007 Workshop on Preference Handling for Artificial Intelligence, Vancouver, 2007.
- Program Committee: AAMAS 2007 Workshop on Agent-Based Systems for Human Learning and Entertainment, Honolulu, 2007.
- Program Committee: AIED 2007 Workshop on Narrative Learning Environments, Marina del Rey, CA, 2007.
- Program Committee: First IEEE International Workshop on Digital Game and Intelligent Toy-Enhanced Learning, Jhongli, Taiwan, 2007.
- Program Committee: AAMAS 2006 Workshop on Agent-Based Systems for Human Learning, Hakodate, Japan, 2006.
- Program Committee: AAMAS 2006 Workshop on Agent-Based Human Learning, Hakodate, Japan, 2006.
- Program Committee: ITS 2006 Workshop on Motivation and Affect in Intelligent Tutoring Systems, Jhongli, Taiwan, 2006.
- Program Committee: ITS 2006 Workshop on Teaching with Agents and Robots, Jhongli, Taiwan, 2006.
- Program Committee: AI-ED 2005 Workshop on Motivation, Emotions and Affect in Educational Software, Amsterdam, 2005.
- Program Committee: AI-ED 2005 Workshop on Educational Games as Intelligent Learning Environments, Amsterdam, 2005.

- Program Committee: AAMAS 2005 Workshop on Agent-Based Systems for Human Learning, Utrecht, The Netherlands, 2005.
- Program Committee: Third International Workshop on Narrative and Interactive Learning Environments (NILE-2004), Edinburgh, Scotland, 2004.
- Program Committee: Advanced Visual Interfaces 2004 Workshop on How Human-Like Should an Intelligent Interface Be?, Gallipoli, Italy, 2004.
- Program Committee: Fourth International Working Conference on Intelligent Virtual Agents (IVA-2003), Irsee, Germany, 2003.
- Program Committee: Second International Symposium on Smart Graphics (Smart Graphics 2002), IBM T. J. Watson Research Center, Hawthorne, NY, 2002.
- Program Committee: Second International Workshop on Narrative and Interactive Learning (NILE-2002) Environments, Edinburgh, Scotland, 2002.
- Program Committee: Agents 2001 Workshop on Representing, Annotating, and Evaluating Non-Verbal and Verbal Communicative Acts to Achieve Contextual Embodied Agents, Montreal, 2001.
- Program Committee: First International Symposium on Smart Graphics (Smart Graphics 2001), IBM T. J. Watson Research Center, Hawthorne, NY, 2001.
- Program Committee: AAAI Symposium on Plan Acquisition for Intelligent Software Agents: Learning How to Do Things, Cape Cod, MA, 2000.
- Program Committee: AAAI Fall Symposium on Building Dialogue Systems for Tutorial Applications, Cape Cod, MA, 2000.
- Organizing Committee and Program Committee: Agents 2000 Workshop on Achieving Human-Like Behavior in Interactive Animated Agents, Barcelona, Spain, 2000.
- Program Committee: Agents 2000 Workshop on Communicative Agents in Intelligent Virtual Environments, Barcelona, Spain, 2000.
- Program Committee: INLG-2000 Workshop on Natural Language Generation Workshop on Coherence in Generated Multimedia, Mitzpe Ramon, Israel, 2000.
- Program Committee: AAAI Spring Symposium on Smart Graphics, Stanford, 2000.
- Organizing Committee: IUI-2000 Workshop on Using Plans in Intelligent User Interfaces, New Orleans, 2000.
- Program Committee: AAAI Fall Symposium on Narrative Intelligence, Cape Cod, MA, 1999.
- Program Committee: AI-ED 1999 Workshop on Instructional Uses of Animated and Personified Agents, Le Mans, France, 1999.
- Program Committee: Fifteenth Twente Workshop on Language Technology: Interactions in Virtual Worlds, University of Twente, Enschede, The Netherlands, 1999.
- Program Committee: Agents 1999 Workshop on Communicative Agents: The Use of Natural Language in Embodied Systems, Seattle, 1999.
- Program Committee: ECAI-1998 (European Conference on Artificial Intelligence) Workshop on AI/ALife and Entertainment, Brighton, UK, 1998.
- Program Committee: Fifth International Workshop on Agent Theories, Architectures, and Languages (ATAL-1998), Paris, France, 1998.
- Organizing Committee: AAAI-98 Workshop on Representations for Multi-modal Human-Computer Interaction, Madison, Wisconsin, 1998.

- Organizing Committee and Program Committee: IJCAI-97 Agents Workshop on Animated Interface Agents: Making Them Intelligent, Nagoya, Japan, 1997.
- Program Committee: Fourth International Workshop on Agent Theories, Architectures, and Languages (ATAL-1997), Providence, Rhode Island, 1997.
- Organizing Committee: NIST Workshop on Education and Training Technology, Washington, DC, 1996.

Journal Reviewer

- *British Journal of Educational Technology*, 2022.
- *Computers in Human Behavior*, 2021.
- *Computers & Education*, 2021.
- *International Journal of Computer-Supported Collaborative Learning*, 2020.
- *IEEE Transactions on Affective Computing*, 2020.
- *British Journal of Educational Technology*, 2020.
- *Journal of Research in Science Teaching*, 2020.
- *Computers in Human Behavior*, 2020.
- *Computers & Education*, 2020.
- *Educational Psychology*, 2019.
- *British Journal of Educational Technology*, 2019.
- *International Journal of Human-Computer Studies*, 2019.
- *Computers & Education*, 2019
- *IEEE Transactions on Learning Technologies*, 2019.
- *IEEE Transactions on Learning Technologies*, 2018.
- *IEEE Transactions on Learning Technologies*, 2017.
- *Human-Computer Interaction*, 2017.
- *Artificial Intelligence Review*, 2016.
- *Educational Psychologist*, 2016.
- *IEEE Transactions on Learning Technologies*, 2015.
- *Educational Psychologist*, 2015.
- *IEEE Transactions on Computational Intelligence and AI in Games*, 2015.
- *Artificial Intelligence*, 2014.
- *Human-Computer Interaction*, 2014.
- *Interacting with Computers*, 2014.
- *ACM Transactions on Interactive Intelligent* Systems, 2013.
- *Artificial Intelligence*, 2013
- *International Journal of Artificial Intelligence in Education*, 2013.
- *Human-Computer Interaction*, 2012.

- *IEEE Transactions on Learning Technologies,* 2012.
- *Computer Speech and Language*, 2012.
- *Human-Computer Interaction*, 2011.
- *Presence*, 2011.
- *IEEE Transactions on Learning Technologies*, 2011.
- *International Journal of Human-Computer Studies*, 2011.
- *IEEE Transactions on Affective Computing*, 2011.
- *International Journal of Human-Computer Studies*, 2010.
- *IEEE Transactions on Affective Computing*, 2010.
- *Journal of Multimodal User Interfaces*, 2010.
- *User Modeling and User-Adapted Interaction*, 2010.
- *Journal of Ambient Intelligence and Smart Environments*, 2010.
- *Natural Language Engineering*, 2009.
- *Journal of Media Psychology*, 2009.
- *Journal of Educational Technology & Society*, 2009.
- *IEEE Transactions on Computational Intelligence and AI in Games*, 2009.
- *Autonomous Agents and Multiagent Systems, 2009.*
- *International Journal of Human-Computer Studies, 2009.*
- *IEEE Transactions on Learning Technologies, 2008.*
- *International Journal of Artificial Intelligence in Education, 2008.*
- *Journal of Game Development, 2008.*
- *International Journal of Artificial Intelligence in Education*, 2007.
- *International Journal of Learning Technology, 2007.*
- *Journal of Natural Language Engineering*, 2007.
- *User Modeling and User-Adapted Interaction*, 2006.
- *International Journal of Human-Computer Studies*, 2006.
- *Knowledge-Based Systems*, 2006.
- *Journal of Artificial Intelligence*, 2005.
- *User Modeling and User-Adapted Interaction*, 2005.
- *International Journal of Artificial Intelligence in Education*, 2004.
- *International Journal of Artificial Intelligence in Education*, 2002.
- *Journal for Visualization and Computer Animation*, 2002.
- *Computational Linguistics*, 2001.
- *User Modeling and User-Adapted Interaction*, 2000.
- *International Journal of Artificial Intelligence in Education*, 2000.

- *User Modeling and User-Adapted Interaction*, 1999.
- *AI Communications: The European Journal on Artificial Intelligence*, 1999.
- *International Journal of Human-Computer Studies*, 1999.
- *Autonomous Agents and Multiagent Systems*, 1998.
- *Applied Artificial Intelligence*, 1998.
- *International Journal of Expert Systems*, 1995.

Conference Reviewer

- Eighteenth ACM International Conference on Multimodal Interaction (ICMI-2016), Tokyo, 2016.
- Seventeenth ACM International Conference on Multimodal Interaction (ICMI-2015), Seattle, 2015.
- ACM Conference on Creativity + Cognition, Glasgow, 2015.
- Forty-Ninth Annual Meeting of the Association for Computational Linguistics – Human Language Technologies (ACL-HLT 2011), Portland, Oregon, 2011.
- Annual Meeting of the American Educational Research Association (AERA-2011), New Orleans, 2011.
- Twenty-Third International Conference on Computational Linguistics (COLING-2010), Beijing, China, 2010.
- Eleventh Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL-HLT 2010), Los Angeles, 2010.
- Annual Meeting of the American Educational Research Association (AERA-2010), Denver, 2010.
- Twelfth Annual Visualization Symposium (EuroVis-2010), Bordeaux, France, 2010
- National Conference of the North American Association for Computational Linguistics – Human Language Technologies (NAACL-HLT-2009), Boulder, Colorado, 2009.
- 2008 International Conference on Intelligent User Interfaces (IUI-2008), Canary Islands, Spain, 2008.
- Twenty-Fifth SIGCHI Conference on Human Factors in Computing Systems – CHI Notes (CHI-2007), San Jose, 2007.
- Twentieth International Conference on Artificial Intelligence (IJCAI-2007), Hyderabad, India, 2007.
- Nineteenth International Joint Conference on Artificial Intelligence (IJCAI-2005), Edinburgh, 2005.
- Seventeenth Annual ACM Symposium on User Interface Software and Technology (UIST-2004), Santa Fe, 2004.
- Thirty-Ninth Annual Meeting of the Association for Computational Linguistics (ACL-2001), Toulouse, France, 2001.
- National Conference of the North American Association for Computational Linguistics (NAACL-2000), Seattle, 2000.
- Graphics Interface 2000, Montreal, 2000.
- Twenty-sixth International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH-1999), Los Angeles, 1999.
- Twenty-First Cognitive Science Society Conference (CogSci-1999), Vancouver, 1999.
- Third International Conference on the Learning Sciences (ICLS-1998), Atlanta, 1998.

- Fourth International Conference on Intelligent Tutoring Systems (ITS-1998), San Antonio, 1998.
- East-West Conference on Human-Computer Interaction, Moscow, 1995.

Grant Proposal Reviewer – International

- Computer Science Evaluation Group, Natural Sciences and Engineering Research Council of Canada (NSERC), 2010-12.
- UK Engineering and Physical Sciences Research Council, 2011.
- Natural Sciences and Engineering Research Council of Canada: 2009, 2010.
- Natural National Science Foundation of China / Research Grants Council of Hong Kong, 2005.

Grant Proposal Reviewer – US

- National Institutes of Health: 2018 (2 Panels), 2019 (1 Panel), 2020 (1 Panel), 2021 (1 Panel).
- National Science Foundation: 1997 (1 Panel), 1998 (2 Panels), 1999 (1 Panel), 2005 (1 Panel), 2007 (2 Panels), 2008 (2 Panels), 2009 (3 Panels), 2010 (2 Panels), 2011 (7 Panels), 2012 (4 Panels), 2013 (1 Panel), 2014 (1 Panel), 2015 (1 Panel), 2016 (4 Panels), 2017 (1 Panel), 2018 (3 Panels), 2019 (3 Panels), 2020 (4 Panels), 2021 (3 Panels).
- U.S. Army: 2009, 2019.
- National Research Council, 1997.