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RESEARCH INTERESTS

Educational Data Mining, Human-Computer Interaction, Intelligent Tutoring Systems, Machine Learning, Interaction Design, Learning Sciences, Learner-Computer Interaction, Gaming the System, Quantitative Field Observation, Motivational and Cognitive Modeling

EDUCATION

Ph. D. Human-Computer Interaction. Carnegie Mellon University. Conferred on December 22, 2005. Advisors: Kenneth R. Koedinger, Albert T. Corbett

M.S. Human-Computer Interaction. Carnegie Mellon University. Conferred August 9, 2005.

ScB. Computer Science. Brown University. Graduated with Honors in Computer Science, May 2000.

PROFESSIONAL EXPERIENCE

Post Doctoral Fellow. Human-Computer Interaction Institute/Pittsburgh Science of Learning Center. Carnegie Mellon University. Summer 2007- present. Mentor: Vincent Aleven.

Research Fellow. Learning Sciences Research Institute. University of Nottingham. Spring 2006 – Spring 2007. Mentor: Shaaron Ainsworth.

Post Doctoral Fellow. Human-Computer Interaction Institute. Carnegie Mellon University. Winter 2006.

Graduate Research Assistant/ Graduate Fellow. Human-Computer Interaction Institute. Carnegie Mellon University. Advisors: Kenneth R. Koedinger, Albert T. Corbett. Fall 2000 – Fall 2005.

Undergraduate Research Assistant. JDSDL (Data Structures Library in JAVA) Project. Computer Science Department. Brown University. Advisor: Roberto Tamassia. Summer 1997 – Spring 2000.

Research Assistant. LARC (LABoratory for Recreational Computing) Games Lab. Computer Science Department. University of North Texas. Advisor: Ian Parberry. Summer 1995– Spring 1996.

Educational Software Developer. Office of Education. Superconducting Super Collider Laboratory. Managers: Sam Kivlighn, Tom Gadsden. Summer 1992– Spring 1994.

COURSES TAUGHT

Research Methods for the Learning Sciences. Co-taught with Kenneth R. Koedinger. Human-Computer Interaction Institute, Carnegie Mellon University. Spring 2008.

Learning and Technology. Co-taught with Claire O'Malley. Learning Sciences Research Institute, University of Nottingham. Spring 2007.

Human-Computer Interaction for Computer Scientists. Co-taught with Kenneth R. Koedinger, Jacob Wobbrock, and A. Fleming Seay. Human-Computer Interaction Institute, Carnegie Mellon University. Spring 2004.

OTHER TEACHING EXPERIENCE

Teaching Assistant. Cognitive Modeling and Intelligent Tutoring Systems, Professor Kenneth R. Koedinger. Human-Computer Interaction Institute, Carnegie Mellon University. Spring 2001.

Teaching Assistant. Advanced Algorithms, Professor Franco Preparata. Department of Computer Science, Brown University. Fall 1999.

Head Teaching Assistant. Data Structures and Algorithms, Professor Roberto Tamassia. Department of Computer Science, Brown University. Spring 1999.

Teaching Assistant. Data Structures and Algorithms, Professor Roberto Tamassia. Department of Computer Science, Brown University. Spring 1998.

Teaching Assistant. Intensive Algebra II Course. Intensive Mathematics Institute, Denton, TX. Summer 1996.

Student Advised. Brian Thompson (B.S. student in Computer Science at Carnegie Mellon University). Summer research project; co-advised with Albert Corbett.

Thesis Committee Member. Elizabeth Anglo (Ph.D. student in Computer Science at Ateneo de Manila University).

Thesis Committee Member. Karina Hizon (M.S. student in Computer Science at Ateneo de Manila University).

External Examiner. Lichao Li (M.S. student in Information Technologies at University of Sydney).

Guest Lecturer. Educational Games. Instructor Vincent Alevan. Human-Computer Interaction Institute, Carnegie Mellon University. Fall 2007.

Guest Lecturer. Intelligent Tutoring Systems and Cognitive Modeling. Instructor Neil Heffernan. Department of Computer Science, Worcester Polytechnic Institute. Fall 2007.

Guest Lecturer. Information and Communication Technologies in Education. Module Convenor Charles Crook. Learning Sciences Research Institute, University of Nottingham. Fall 2006.

Guest Lecturer. Information and Communication Technologies in Education. Module Convenor Charles Crook. Learning Sciences Research Institute, University of Nottingham. Spring 2006.

Guest Lecturer. Telepresence Applications. Instructor Peter Coppin. Robotics Institute, Carnegie Mellon University. Fall 2003.

Guest Lecturer. Data Structures and Algorithms, Instructor Roberto Tamassia. Department of Computer Science, Brown University. Spring 2000.

PUBLICATIONS

(Citation counts are from Google Scholar, January 20, 2008)

Refereed Journal Papers

Baker, R.S.J.d., Corbett, A.T., Roll, I., Koedinger, K.R. (in press) Developing a Generalizable Detector of When Students Game the System. To appear in *User Modeling and User-Adapted Interaction*.

Baker, R.S.J.d., Walonoski, J.A., Heffernan, N.T., Roll, I., Corbett, A.T., Koedinger, K.R. (in press) Why Students Engage in “Gaming the System” Behavior in Interactive Learning Environments. To appear in *Journal of Interactive Learning Research*.

Baker, R.S.J.d., Corbett, A.T., Koedinger, K.R. (2007) The Difficulty Factors Approach to the Design of Intelligent Tutoring Systems. *International Journal of Artificial Intelligence in Education*, 17 (4), 341-369.

Baker, R.S., Corbett, A.T., Koedinger, K.R. (2006) Responding to Problem Behaviors in Cognitive Tutors: Towards Educational Systems Which Support All Students. *National Association for the Dually Diagnosed (NADD) Bulletin*, 9 (4), 70-75.

Tamassia R., Goodrich M.T., Vismara L., Handy M., Cohen R., Hudson B., Baker, R.S., Gelfand, N., Shubina G., Brandes U. (2001) JDSDL: The Data Structures Library in Java. *Dr. Dobb's Journal and Sourcebook*, April 2001, 21-33.

Refereed Conference Full Papers

Baker, R.S.J.d. (2007) Modeling and Understanding Students' Off-Task Behavior in Intelligent Tutoring Systems. *Proceedings of ACM CHI 2007: Computer-Human Interaction*, 1059-1068.

[Honorable Mention for Best Paper Award]

Baker, R.S.J.d., Rodrigo, M.M.T., Xolocotzin, U.E. (2007) The Dynamics of Affective Transitions in Simulation Problem-Solving Environments. *Proceedings of the Second International Conference on Affective Computing and Intelligent Interaction*.

Baker, R.S.J.d., Habgood, M.P.J., Ainsworth, S.E., Corbett, A.T. (2007) Modeling the Acquisition of Fluent Skill in Educational Action Games. *Proceedings of User Modeling 2007*, 17-26.

Rodrigo, M.M.T., Baker, R.S.J.d., Lagud, M.C.V., Lim, S.A.L., Macapanpan, A.F., Pascua, S.A.M.S., Santillano, J.Q., Sevilla, L.R.S., Sugay, J.O., Tep, S., Viehland, N.J.B. (2007) Affect and Usage Choices in Simulation Problem Solving Environments. *Proceedings of Artificial Intelligence in Education 2007*, 145-152.

Baker, R.S.J.d., Corbett, A.T., Koedinger, K.R., Evenson, E., Roll, I., Wagner, A.Z., Naim, M., Raspat, J., Baker, D.J., Beck, J. (2006) Adapting to When Students Game an Intelligent Tutoring System. *Proceedings of the 8th International Conference on Intelligent Tutoring Systems*, 392-401. **[Won Best Paper Award]**

Baker, R.S.J.d., Corbett, A.T., Koedinger, K.R., Roll, I. (2006) Generalizing Detection of Gaming the System Across a Tutoring Curriculum. *Proceedings of the 8th International Conference on Intelligent Tutoring Systems*, 402-411. **[Finalist for Best Paper Award]**

Roll, I., Alevan, V., McLaren, B.M., Ryu, E., Baker, R.S.J.d., Koedinger, K.R. (2006) The Help Tutor: Does Metacognitive Feedback Improve Students' Help-Seeking Actions, Skills, and Learning? *Proceedings of the 8th International Conference on Intelligent Tutoring Systems*, 360-369.

Baker, R.S., Roll, I., Corbett, A.T., Koedinger, K.R. (2005) Do Performance Goals Lead Students to Game the System? *Proceedings of the International Conference on Artificial Intelligence and Education (AIED2005)*, 57-64. **[Finalist for Best Paper Award]**

Fogarty, J., Baker, R., Hudson, S. (2005) Case Studies in the use of ROC Curve Analysis for Sensor-Based Estimates in Human Computer Interaction. *Proceedings of Graphics Interface (GI 2005)*, 129-136.

Roll, R., Baker, R., Alevan, V., McLaren, B., Koedinger, K. (2005) Modeling Students' Metacognitive Errors in Two Intelligent Tutoring Systems. *Proceedings of User Modeling 2005*, 367-376.

Baker, R.S., Corbett, A.T., Koedinger, K.R. (2004) Detecting Student Misuse of Intelligent Tutoring Systems. *Proceedings of the 7th International Conference on Intelligent Tutoring Systems*, 531-540. **(37 non-self-citations, 15 self-citations)**

Baker, R.S., Corbett, A.T., Koedinger, K.R. (2004) Learning to Distinguish Between Representations of Data: a Cognitive Tutor That Uses Contrasting Cases. *Proceedings of the International Conference of the Learning Sciences*, 58-65.

Baker, R.S., Corbett, A.T., Koedinger, K.R., Wagner, A.Z. (2004) Off-Task Behavior in the Cognitive Tutor Classroom: When Students "Game The System". *Proceedings of ACM CHI 2004: Computer-Human Interaction*, 383-390. **(23 non-self-citations, 20 self-citations)**

Baker R.S., Corbett A.T., Koedinger K.R., Schneider, M.P. (2003) A Formative Evaluation of a Tutor for Scatterplot Generation: Evidence on Difficulty Factors. *Proceedings of the International Conference on Artificial Intelligence in Education*, 107-115.

Baker R.S., Corbett A.T., Koedinger K.R. (2002) The Resilience of Overgeneralization of Knowledge about Data Representations. Paper presented at American Educational Research Association Conference. Available from *Education Resources Information Center (ERIC) Database*, ERIC# ED465530.

Baker R.S., Corbett A.T., Koedinger K.R. (2001) Toward a Model of Learning Data Representations. *Proceedings of the 23rd Conference of the Cognitive Science Society*, 45-50.

Baker, R.S., Boilen, M., Goodrich, M., Tamassia, R., and Stibel, B.A.(1999) Testers and Visualizers for Teaching Data Structures. *30th ACM SIGCSE Technical Symposium on Computer Science Education*, 261-265. **(40 non-self-citations, 5 self-citations)**

Refereed Conference Short Papers and Poster Papers

Baker, R.S., Corbett, A., Koedinger, K., Roll, I. (2005) Detecting When Students Game The System, Across Tutor Subjects and Classroom Cohorts. *Proceedings of User Modeling 2005*, 220-224.

Baker, R.S., Wagner, A.Z., Corbett, A.T., Koedinger, K.R. (2004) The Social Role of Technical Personnel in the Deployment of Intelligent Tutoring Systems. *Proceedings of 7th International Conference on Intelligent Tutoring Systems*, 785-787.

Roll, I., Baker, R.S., Aleven, V., Koedinger, K.R. (2004) A Metacognitive ACT-R model of Students' Learning Strategies in Intelligent Tutoring Systems. *Proceedings of 7th International Conference on Intelligent Tutoring Systems*, 854-856.

Roll, I., Baker, R.S., Aleven, V., Koedinger, K.R. (2004) What goals do students have when choosing the actions they perform? *Proceedings of 6th International Conference on Cognitive Modeling*, 380-381.

Dabbish L.A., Baker R.S. (2003) Administrative Assistants as Interruption Mediators. *ACM CHI: Computer-Human Interaction*, 1020-1021.

Edited Proceedings

Baker, R.S.J.d., Beck, J., Berendt, B., Kroner, A., Menasalvas, E., Weibelzahl, S. (Eds.) *Complete On-Line Proceedings of the Workshop on Data Mining for User Modeling, at the 11th International Conference on User Modeling (UM 2007)*. Corfu, Greece. June 2007.

Heiner, C., Baker, R., Yacef, K. (Eds.) *Proceedings of the Workshop on Educational Data Mining, at the 8th International Conference on Intelligent Tutoring Systems*. Jhongli, Taiwan. July 2006.

Technical Reports

Baker, R.S., Wagner, A.Z., Corbett, A.T., Koedinger, K.R. (2004) The Social Role of Technical Personnel in the Deployment of Intelligent Tutoring Systems. *CMU Technical Report CMU-HCII-04-100*, July 2004.

Workshop Papers/Presentations

Baker, R.S.J.d. (2007) Is Gaming the System State-or-Trait? Educational Data Mining Through the Multi-Contextual Application of a Validated Behavioral Model. *Complete On-Line Proceedings of the Workshop on Data Mining for User Modeling at the 11th International Conference on User Modeling 2007*, 76-80.

Baker, R.S.J.d., Corbett, A.T., Wagner, A.Z. (2006) Human Classification of Low-Fidelity Replays of Student Actions. *Proceedings of the Workshop on Educational Data Mining at the 8th International Conference on Intelligent Tutoring Systems*, 29-36.

Baker, R.S., Beck, J.S. (2005) Psychometric Machine-Learned Models. *Presentation at the Educational Data Mining Workshop at the annual meeting of the American Association for Artificial Intelligence*.

Baker, R.S., Corbett, A.T., Koedinger, K.R. (2003) Statistical Techniques For Comparing ACT-R Models of Cognitive Performance. *Proceedings of the 10th Annual ACT-R Workshop*, 129-134.

Theses

Baker, R.S. (2005) Designing Intelligent Tutors That Adapt to When Students Game the System. Doctoral Dissertation. Advisors: Kenneth R. Koedinger, Albert T. Corbett

Baker, R.S. (2000) PILOT: An Interactive Tool for Learning and Grading. Senior Honors Thesis, Brown University. Advisors: Roberto Tamassia, Thomas Dean.

Other Workshop and Conference Participation

Baker, R.S.J.d, Alevan, V., Koedinger, K.R., Rodrigo, M., Heffernan, N.T., Corbett, A.T., Roll, I. (2008) Gaming the System: Evidence from Data Mining and Human Observation on Affect, Attitudes, and Learning. Presentation at *Technology, Instruction, Cognition, and Learning Symposium*.

Koedinger, K.R., Alevan, V., Baker, R.S.J.d., Roll, I. (2007) Toward Understanding When Tutoring Meta-Cognition Enhances Domain Learning. *Workshop on Metacognition and Self-Regulated Learning in Intelligent Tutoring Systems*, 1-2.

Baker, R.S. (2006) Educational Data Mining. Panel "Intelligent Tutoring Scales Up!" at 8th *International Conference on Intelligent Tutoring Systems*.

Koedinger, K.R., Baker, R.S. (2006) Production Systems. *Presentation at the TICL Masters Conference*.

Rosé, C.P., Anthony, L., Baker, R.S., Corbett, A.T., Pain, H., Porayska-Pomsta, K. (2004) Towards Encouraging a Learning Orientation Above a Performance Orientation. Panel at 7th *International Conference on Intelligent Tutoring Systems*, 907.

Baker R.S., Corbett A.T., Koedinger K.R. (2002) Distinct Errors Arising From a Single Misconception. Published as abstract, *Proceedings of the Cognitive Science Society Conference*, 990.

Baker R., Parberry I. (1996) Increasing Frame Rate In An Interactive Sprite Engine. Published as abstract, *Texas Academy of Science Conference*.

INVITED SEMINARS

Towards Educational Software that Detects and Responds to All the Ways Students Choose to Use It. Department of Computer Science, Worcester Polytechnic Institute. September 14, 2007.

Detecting and Understanding Gaming the System and Off-Task Behavior in Intelligent Tutoring Systems. London Knowledge Lab, University of London. April 26, 2007.

Developing Systems that Detect and Adapt to When Students Game the System. Human-Centered Technology Group, School of Informatics, University of Sussex. November 2, 2006.

Developing Systems that Detect and Adapt to When Students Game the System. School of Informatics, University of Edinburgh. October 27, 2006.

Scooter: an Agent Who Adapts to When Students Game the System. Mixed Reality Laboratory, School of Computer Science, University of Nottingham. October 20, 2006.

Gaming the System: How it Affects Learning and Why Students Do It. Pädagogische Psychologie Group, Department of Psychology, University of Muenster. July 14, 2005.

Remediating Resilient Overgeneralization in Data Representation. Pittsburgh Supergroup for Scientific Reasoning, University of Pittsburgh. October 10, 2003.

A model of resilient overgeneralization: When you know bar graphs, all data looks categorical. UIC Cognitive Brown Bag Lecture, University of Illinois at Chicago. November 20, 2001.

AWARDS

Best Paper Award. 8th International Conference on Intelligent Tutoring Systems, 2006.

Senior Prize in Computer Science. Brown University, 2000.

GRANTS AND FELLOWSHIPS

Pittsburgh Science of Learning Center Project Award. How Content and Interface Features Influence Student Choices Within the Learning Space. Baker, R.S.J.d., Corbett, A.T., Koedinger, K.R. July 2007 - March 2008. \$73,718.

Kaleidoscope Initiative. A Centralized Research Data Repository. Melis, E., McLaren, B., Adam, J-M., David, J-P., Harrer, A., Mones, A.M., de Jong, T., Baker, R., Giraud, S., Martel, C. March-December 2007. €15,000.

National Defense Science and Engineering Graduate Fellowship. American Society of Engineering Education/Department of Defense. Fall 2001- Spring 2004.

ACADEMIC SERVICE

Program Chair (with Joseph E. Beck). *First International Conference on Educational Data Mining*, Montreal, Canada, June 20-21, 2008.

Workshop Co-Chair. Workshop on Data Mining for User Modeling. *11th International Conference on User Modeling*. 2007.

Workshop Co-Chair. Workshop on Educational Data Mining. *8th International Conference on Intelligent Tutoring Systems*. 2006.

Workshop Organizing Committee. Workshop on Analyzing Student-Tutor Interaction Logs to Improve Educational Outcomes. *7th International Conference on Intelligent Tutoring Systems*. Chair: Joseph Beck. 2004.

Co-Founder and Webmaster. International Working Group on Educational Data Mining. www.educationaldatamining.org. 2006.

Program Committee. Intelligent Tutoring Systems (2008)

Flairs-2008 Special Track on Intelligent Tutoring Systems (2008)
User Modeling (2007)
Digital Game and Intelligent Toy Enhanced Learning (2007)
Workshop on Educational Data Mining, ICALT (2007)
Workshop on Educational Data Mining, AIED (2007)
International Workshop on Applying Data Mining in e-Learning,
EC-TEL (2007)
Workshop on Metacognition and Self-Regulated Learning in
Intelligent Tutoring Systems, AIED (2007)

Conference Reviewing. Computer-Human Interaction (2008, 2007)
Artificial Intelligence in Education (2007, 2005, 2003)
Intelligent User Interfaces (2008)
User Modeling (2007, 2003)
Cognitive Science Society (2007, 2005, 2003)
User Interface Software and Technology (2007)
Digital Game and Intelligent Toy Enhanced Learning (2007)
Intelligent Tutoring Systems (2006, 2002)
Computers in Education (2006)
Cognitive Modeling (2004)
European Cognitive Science Society (2003)
American Educational Research Association (2003)
Learning Sciences Conference (2002)
Workshop on Social and Emotional Intelligence in Learning
Environments, ITS (2004)

Journal Reviewing. User Modeling and User-Adapted Interaction (2007, 2006)
Journal of Computer Assisted Learning (2007)
ACM Transactions on the Web (2007)
Journal of Visual Languages and Computing (2007)
Cognition and Instruction (2006)
International Journal of Artificial Intelligence in Education (2006)

Seminar Co-Organizer. (with Sandra Katz) Pittsburgh Science of Learning Center. Carnegie Mellon University/ University of Pittsburgh. 2008.

Seminar Co-Organizer. Research and Publication Reading Group. Learning Sciences Research Institute. University of Nottingham. 2006-2007.

Seminar Organizer. Human-Computer Interaction Institute PhD lunches. 2002-2004.