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Institute for Intelligent Systems and Department of Psychology
University of Memphis
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Education

Ph.D., (Cognitive Psychology), Carnegie Mellon University, Pittsburgh, PA/USA Thesis Title: The microeconomics of learning: Optimizing paired-associate memory Advisor: John Anderson	12/2005
Certificate from the Center for the Neural Basis of Cognition (CNBC), Carnegie Mellon University and University of Pittsburgh, Pittsburgh, PA/USA	12/2005
B.A., Economics, University of Michigan, Ann Arbor, MI/USA	12/1992

Postdoctoral Training

Human-Computer Interaction Institute, Pittsburgh Science of Learning Center, Carnegie Mellon University, Pittsburgh, PA Supervisor: Kenneth Koedinger	09/2005–07/2008

Academic Appointments

Associate Professor Institute for Intelligent Systems and Psychology, University of Memphis, Memphis, TN	9/2017–current
Tenure	9/2017
Assistant Professor Department, University, City, State	8/2011-8/2017
Systems Scientist, Carnegie Mellon University, Pittsburgh, PA	7/2008–8/2011

Educational Activities

Educational Leadership, Administration and Service

Director, Cognitive Area of Experimental Psychology Program	2015-current
Member, Psychology Undergraduate Advisory Committee	2015-2018

Teaching Activities in Programs and Courses

Psych 7222/8222: Human Memory, University of Memphis	2020
Psych 4305: Mind, Brain, and Intelligence, University of Memphis	2015
Psych 7302/8302: Advanced Statistics in Psychology I, University of Memphis	2011-2021
Psych 7514/8514: Cognitive Science Seminar, "Generalization and discrimination of categories and concepts in the transfer of learning", University of Memphis	2013

Psych 7503/8503: Seminar in Experimental Psychology, “Adaptive Learner Modeling”, University of Memphis	2014
Research Methods for the Learning Sciences (with Ken Koedinger supervisor), 85-748, Carnegie Mellon	2010

Advising and MentoringStudents (as chair)

Wei Chu, Cognitive PhD	2019-current
Meng Cao, Cognitive PhD	2018-current
Kaitlyn Peperone, Masters General Psychology	2017-2019
Jacklyn Maass, Cognitive PhD Assistant Professor, University of Central Oklahoma	2011-2017
Kenneth Barideaux Jr., Cognitive PhD Assistant Professor, University of SC Upstate	2011-2017
Henry Hua, Program, Cognitive PhD Assistant Professor, Marshall B. Ketchum University	2013-2015
Chanda Murphy, Cognitive PhD Instructor of Psychological Science & Counseling, Austin Peay State University	2014-2017
Adam Boyd, Masters General Psychology	2012-2015
Shardae Dawkins, Masters General Psychology	2014-2015
Clayton Estey, Masters General Psychology	2012-2015

Postdoctoral Trainees

Luke Eglington, Schmidt Foundation Postdoc and IES Grant Postdoc Research Scientist, Georgia Institute of Technology	2019-2021
Michael Yudelson, IES grant with Kenneth Koedinger Principal ML/AI Engineer at BrainPOP	2010-2011

Grants

Current

IES R305A190448 Principal Investigator (PI) P. Pavlik — 2019-2022
Using Adaptive Practice to Improve Recall and Understanding in Postsecondary Anatomy and Physiology
Description: Application for anatomy and physiology including cloze practice and dialogue
Total: $1,240,151
Role: PI (25% effort)

NSF 1934745 Principal Investigator (PI) V. Rus — 2020-2021
The Learner Data Institute: Harnessing The Data Revolution To Make The Learning Ecosystem More Effective, Efficient, and Engaging
Description: Seed grant for learning data institute
Total: $ 2,584,309
Role: Co-PI (8% effort)

Pending

IES GRANT13463684 Principal Investigator (PI) P. Carvalho 2022-2026
Optimal spaced retrieval in K-12 classrooms using technology
Description: Working with non-profit corporate partner Podsie.
Total: $1,999,997
Role: Co-PI (16% effort)

Completed

Schmidt Family Foundation (subaward from Carnegie Mellon University) A18-0103 Principal Investigator (PI) P. Pavlik, Memphis and McGraw Hill Education 2018-2019
Postdoc
Total: $200,000
Role: PI (5% effort)

Office of Naval Research N00014-16-C3027 Principal Investigator (PI) A. Graesser 2016-2018
Integration of Intelligent Tutoring Systems for Electronics ONRBAA (Option B)
Description: Conversational tutoring system for electronics
Total: $1,491,371
Role: Co-I (8% effort)

National Science Foundation ACI1443068 Principal Investigator (PI) P. Pavlik 2015-2019
CIF21 DIBBs: Building a Scalable Infrastructure for Data-Driven Discovery and Innovation in Education Source of Support: National Science Foundation (subcontract with Carnegie Mellon University)
Description: Collaboration on the LearnSphere student data analysis tool
Total: $750,000 subcontract amount for Memphis
Role: PI (16% effort)

Army Research Lab W911NF-12-2-0030 Principal Investigator (PI) X. Hu 2012-2017
Generalized Intelligent Framework for Tutors (GIFT)
Description: Book series on aspects of GIFT
Total: $1,289,545
Role: Co-I (8% effort)

Pittsburgh Science of Learning Principal Investigator (PI) P. Pavlik 2009-2011
Motivational effects in vocabulary learning: difficulty and strategy use
Description: Experimental investigation of interactions of difficulty and strategy use.
Total: $70,000
Role: PI (16% effort)

IES R305B070487 Principal Investigator (PI) P. Pavlik 2007-20011
Bridging the Bridge to Algebra: Measuring and Optimizing the Influence of Prerequisite Skills on a Pre-Algebra Curriculum
Description: Add practice of pre-algebra prerequisites to algebra Cognitive Tutor
Total: $1,120,955
Role: PI (75% effort)

Private donation from Ronald Zdrojkowski postdoctoral work with Koedinger 2005-2008
Description: Applying theoretical models of learning to optimizing instruction in students
Total: $411,000
Role: PI (100% effort)

Synergistic Projects

LKT (Logistic Knowledge Tracing) R code package – this project is a flexible framework for learner models in logistic regression that loads into R as a library. The models can be added to the MoFaCTS system to predict practice effects and optimize learning. 2019-current

MoFaCTS (Mobile Fact and Concept Training System) Project – this project is the MoFaCTS software system for learning experiments and adaptive practice. This system has been under development for 15 years and is a testbed for theories and applications. Several publications detail its functions, and multiple grants have been proposed in its development. 2006-current

Scholarship

Peer-reviewed journal publications and full proceedings (Journal papers bolded)

Eglington, L. G., & Pavlik Jr, P. I. (under review). Systematic prediction errors from individual differences are inevitable and treatable.

Scruggs, R. T., Baker, R. S. J. d., Pavlik Jr, P. I., & McLaren, B. (under review). How well do contemporary knowledge tracing Algorithms predict the knowledge carried out of a digital learning game?

Banker, A., Pavlik, P. I., Olney, A., & Eglington, L. (under review). Online tutoring system (MoFaCTS) Implementation in Anatomy and Physiology Classes for Individual Online Tutoring.

Pavlik Jr, P. I., Eglington, L. G., & Harrell-Williams, L. M. (minor revisions submitted). Logistic Knowledge Tracing: A constrained framework for learner modeling. *arXiv.org*.

Barideaux Jr., K. J., & Pavlik Jr., P. I. (minor revisions submitted). Can concept maps minimize auditory interference when studying with music?

Pavlik Jr, P. I., Eglington, L. G., & Cao, M. (in preparation). Practical Optimal Practice Scheduling

Pavlik Jr., P. I., & Eglington, L. (2021). The Mobile Fact and Concept Textbook System (MoFaCTS) Computational Model and Scheduling System. In *21st International Conference on Artificial Intelligence in Education (AIED 2021) Third Workshop on Intelligent Textbooks* (pp. 1-15). In CEUR workshop proceedings (Vol. to be released).

Eglington, L. G., & Pavlik Jr, P. I. (2020). Optimizing practice scheduling requires quantitative tracking of individual item performance. *npj Science of Learning, 5*(1), 15. https://doi.org/10.1038/s41539-020-00074-4

Pavlik Jr., P. I., Olney, A. M., Banker, A., Eglington, L., & Yarbro, J. (2020). The Mobile Fact and Concept Textbook System (MoFaCTS). In *21st International Conference on Artificial Intelligence in Education (AIED 2020) Second Workshop on Intelligent Textbooks* (pp. 35–49). In CEUR workshop proceedings (Vol. 2674).

Eglington, L., & Pavlik Jr, P. I. (2019). Predictiveness of prior failures is modulated by trial duration. *Journal of Educational Data Mining, 11*, 1-19.

Graesser, A. C., Hu, X., Nye, B. D., VanLehn, K., Kumar, R., Heffernan, C., Heffernan, N., Woolf, B., Olney, A. M., Rus, V., Andrasik, F., Pavlik, P., Cai, Z., Wetzel, J., Morgan, B., Hampton, A. J., Lippert, A. M., Wang, L., Cheng, Q., Vinson, J. E., Kelly, C. N., McGlown, C., Majmudar, C. A., Morshed, B., & Baer, W. (2018). ElectronixTutor: an intelligent tutoring system with multiple learning resources for electronics.

***International Journal of STEM Education, 5*(1), 15. https://doi.org/10.1186/s40594-018-0110-y**

Murphy, C. S., & Pavlik Jr, P. I. (2018). Effects of Spacing and Testing on Inductive Learning. *Journal of Articles in Support of the Null Hypothesis, 14*(2), 23-39.

Nye, B. D., Pavlik, P. I., Windsor, A., Olney, A. M., Hajeer, M., & Hu, X. (2018). SKOPE-IT (Shareable Knowledge Objects as Portable Intelligent Tutors): overlaying natural language tutoring on an adaptive learning system for mathematics. *International Journal of STEM Education, 5*(1), 12. https://doi.org/10.1186/s40594-018-0109-4

Hampton, A. J., Nye, B. D., Pavlik, P. I., Swartout, W. R., Graesser, A. C., & Gunderson, J. (2018). Mitigating Knowledge Decay from Instruction with Voluntary Use of an Adaptive Learning System. In *Proceedings of the International Conference on Artificial Intelligence in Education* (pp. 119-133). Springer International Publishing.

Shi, G., Lippert, A. M., Shubeck, K., Fang, Y., Chen, S., Pavlik, P., Greenberg, D., & Graesser, A. C. (2018). Exploring an intelligent tutoring system as a conversation-based assessment tool for reading comprehension. *Behaviormetrika, 45*(2), 615-633. https://doi.org/10.1007/s41237-018-0065-9

Olney, A. M., Pavlik, P. I., & Maass, J. K. (2017). Improving Reading Comprehension with Automatically Generated Cloze Item Practice. In E. André, R. Baker, X. Hu, M. M. T. Rodrigo, & B. du Boulay (Eds.), *Proceedings of Artificial Intelligence in Education: 18th International Conference* (pp. 262-273). Springer International Publishing. https://doi.org/10.1007/978-3-319-61425-0_22

Koedinger, K. R., Yudelson, M. V., & Pavlik, P. I. (2016). Testing theories of transfer using error rate learning curves. *Topics in Cognitive Science*, published online. https://doi.org/http://doi:10.1111/tops.12208

Thiessen, E. D., & Pavlik Jr, P. I. (2016). Modeling the role of distributional information in children's use of phonemic contrasts. *Journal of Memory and Language, 88*, 117-132. https://doi.org/http://dx.doi.org/10.1016/j.jml.2016.01.003

Li, H., Graesser, A. C., Conley, M., Cai, Z., Pavlik, P. I., & Pennebaker, J. W. (2015). A New Measure of Text Formality: An Analysis of Discourse of Mao Zedong. *Discourse Processes, 52*(1), 1-28. https://doi.org/10.1080/0163853X.2015.1010191

Maass, J. K., Pavlik Jr., P. I., & Hua, H. (2015). How Spacing and Variable Retrieval Practice Affect the Learning of Statistics Concepts. In C. Conati, N. Heffernan, A. Mitrovic, & M. F. Verdejo (Eds.), *17th International Conference on Artificial Intelligence in Education* (Vol. 9112, pp. 247-256). Springer International Publishing.

Medimorec, S., Pavlik Jr, P. I., Olney, A., Graesser, A. C., & Risko, E. F. (2015). The Language of Instruction: Compensating for Challenge in Lectures. *Journal of Educational Psychology, 107*(4), 971-990. https://doi.org/10.1037/edu0000024

Pavlik Jr., P. I., Yudelson, M., & Koedinger, K. R. (2015). A measurement model of microgenetic transfer for improving instructional outcomes. *International Journal of Artificial Intelligence in Education, 25*, 346-379. https://doi.org/http://doi:10.1007/s40593-015-0039-y

Forsyth, C. M., Graesser, A. C., Pavlik Jr., P. I., Cai, Z., Butler, H., Halpern, D. F., & Millis, K. (2013). Operation aries!: Methods, mystery, and mixed models: Discourse features predict affect and motivation in a serious game. *Journal of Educational Data Mining, 5*(1), 147-189.

Maass, J. K., & Pavlik Jr., P. I. (2013). Using Learner Modeling to Determine Effective Conditions of Learning for Optimal Transfer. In H. C. Lane, K. Yacef, J. Mostow, & P.

Pavlik (Eds.), *Proceedings of Artificial Intelligence in Education* (Vol. 7926, pp. 189-198). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-39112-5_20

Pavlik Jr., P. I. (2013). Mining the Dynamics of Student Utility and Strategy Use during Vocabulary Learning. *Journal of Educational Data Mining, 5*(1), 39-71.

Thiessen, E. D., & Pavlik Jr., P. I. (2013). iMinerva: A Mathematical Model of Distributional Statistical Learning. *Cognitive Science, 37*(2), 310-343. https://doi.org/10.1111/cogs.12011

Koedinger, K. R., Pavlik Jr., P. I., Stamper, J., Nixon, T., & Ritter, S. (2011). Avoiding Problem Selection Thrashing with Conjunctive Knowledge Tracing. In M. Pechenizkiy, T. Calders, C. Conati, S. Ventura, C. Romero , & J. Stamper (Eds.), *Proceedings of the 4th International Conference on Educational Data Mining* (pp. 91–100).

Yudelson, M., Pavlik Jr., P. I., & Koedinger, K. R. (2011). User Modeling – A Notoriously Black Art. In J. Konstan, R. Conejo, J. Marzo, & N. Oliver (Eds.), *Proceedings of User Modeling, Adaption and Personalization* (Vol. 6787, pp. 317-328). Springer Berlin / Heidelberg. https://doi.org/10.1007/978-3-642-22362-4_27

Pavlik Jr., P. I., & Toth, J. (2010). How to build bridges between intelligent tutoring system subfields of research. In J. Kay, V. Aleven, & J. Mostow (Eds.), *Proceedings of the 10th International Conference on Intelligent Tutoring Systems, Part II* (pp. 103–112). Springer.

Pavlik Jr., P. I., Cen, H., & Koedinger, K. R. (2009a). Performance factors analysis -- A new alternative to knowledge tracing. In V. Dimitrova, R. Mizoguchi, B. d. Boulay, & A. Graesser (Eds.), *Proceedings of the 14th International Conference on Artificial Intelligence in Education* (pp. 531–538). https://doi.org/http://doi:10.3233/978-1-60750-028-5-531

Pavlik Jr., P. I., Cen, H., & Koedinger, K. R. (2009b). Learning factors transfer analysis: Using learning curve analysis to automatically generate domain models. In T. Barnes, M. C. Desmarais, C. Romero, & S. Ventura (Eds.), *Proceedings of the 2nd International Conference on Educational Data Mining* (pp. 121–130).

Frishkoff, G., Levin, L., Pavlik Jr., P. I., Idemaru, K., & de Jong, N. (2008). A Model-based Approach to Second-Language Learning of Grammatical Constructions. In V. Sloutsky, B. Love, & K. McRae (Eds.), *Proceedings of the 30th Conference of the Cognitive Science Society* (pp. 916-921).

Koedinger, K. R., Pavlik Jr., P. I., McLaren, B. M., & Aleven, V. (2008). Is it better to give than to receive? The assistance dilemma as a fundamental unsolved problem in the cognitive science of learning and instruction. In V. Sloutsky, B. Love, & K. McRae (Eds.), *Proceedings of the 30th Conference of the Cognitive Science Society* (pp. 2155–2160).

Pavlik Jr., P. I., & Anderson, J. R. (2008). Using a model to compute the optimal schedule of practice. *Journal of Experimental Psychology: Applied, 14*(2), 101–117. https://doi.org/http://doi:10.1037/1076-898X.14.2.101

Pavlik Jr., P. I., Bolster, T., Wu, S., Koedinger, K. R., & MacWhinney, B. (2008). Using optimally selected drill practice to train basic facts. In B. Woolf, E. Aimer, & R. Nkambou (Eds.), *Proceedings of the 9th International Conference on Intelligent Tutoring Systems* (pp. 593–602).

Pavlik Jr., P. I., Cen, H., Wu, L., & Koedinger, K. R. (2008). Using item-type performance covariance to improve the skill model of an existing tutor. In R. S. Baker & J. E. Beck (Eds.), *Proceedings of the 1st International Conference on Educational Data Mining* (pp. 77–86).

Pavlik Jr., P. I. (2007). Understanding and applying the dynamics of test practice and study practice. *Instructional Science, 35*, 407–441. https://doi.org/http://doi:10.1007/s11251-006-9013-2

Pavlik Jr., P. I., Presson, N., Dozzi, G., Wu, S.-m., MacWhinney, B., & Koedinger, K. R. (2007). The FaCT (Fact and Concept Training) System: A new tool linking cognitive science with educators. In D. McNamara & G. Trafton (Eds.), *Proceedings of the Twenty-Ninth Annual Conference of the Cognitive Science Society* (pp. 1379–1384). Lawrence Erlbaum.

Pavlik Jr., P. I., Presson, N., & Koedinger, K. R. (2007). Optimizing knowledge component learning using a dynamic structural model of practice. In R. Lewis & T. Polk (Eds.), *Proceedings of the Eighth International Conference of Cognitive Modeling* (pp. 37–42). University of Michigan.

Pavlik Jr., P. I., & Anderson, J. R. (2005). Practice and forgetting effects on vocabulary memory: An activation-based model of the spacing effect. *Cognitive Science, 29*(4), 559–586. https://doi.org/http://doi:10.1207/s15516709cog0000_14

Pavlik Jr., P. I. (2003). Review of *Dynamical Cognitive Science* [Book review]. *Brain and Cognition, 51*, 155-156.

Pavlik Jr., P. I., & Anderson, J. R. (2003). An ACT-R model of the spacing effect. In F. Detje, D. Dorner, & H. Schaub (Eds.), *Proceedings of the Fifth International Conference of Cognitive Modeling* (pp. 177-182). Universitats-Verlag Bamberg.

Pavlik Jr., P. I. (2001). Hybrid modeling of cognition: A review of *The Atomic Components of Thought* [Book review]. *Brain and Cognition, 47*, 570-573.

Books & Chapters

Pavlik Jr, P. I., Maass, J. K., & Kim, J. W. (2017). Assessment of Forgetting. In R. Sottilare, A. Graesser, X. Hu, & G. Goodwin (Eds.), *Design Recommendations for Intelligent Tutoring System-Volume 5: Assessment Methods* (Vol. 5, pp. 203-208).

Goldin, I., Pavlik Jr, P. I., & Ritter, S. (2016). Discovering domain models in learning curve data. In R. A. Sottilare, A. C. Graesser, X. Hu, A. Olney, B. D. Nye, & A. M. Sinatra (Eds.), *Design Recommendations for Intelligent Tutoring Systems: Volume 4-Domain Modeling* (Vol. 4, pp. 115-126).

Olney, A. M., Brawner, K. W., Pavlik Jr., P. I., & Koedinger, K. R. (2015). Emerging Trends in Automated Authoring. In R. A. Sottilare, A. Graesser, H. Xiangen, & K. W. Brawner (Eds.), *Design Recommendations for Adaptive Intelligent Tutoring Systems: Authoring Tools (Volume 3)*. Army Research Labs/ University of Memphis.

Pavlik Jr., P. I., Hu, X., & Morrison, D. M. (2014). Issues Regarding the Use of Natural Language Discourse In Intelligent Tutoring Systems. In R. A. Sottilare, A. Graesser, X. Hu, & H. K. Holden (Eds.), *Design Recommendations for Adaptive Intelligent Tutoring Systems: Instructional Management* (Vol. 2, pp. 185-187). Army Research Labs/ University of Memphis.

Lane, H. C., Yacef, K., Mostow, J., & Pavlik Jr., P. I. (2013). *Artificial Intelligence in Education: 16th International Conference, AIED 2013, Memphis, TN, USA, July 9-13, 2013. Proceedings*. Springer Publishing Company, Incorporated.

Pavlik Jr., P. I. (2013). Spacing effect. In H. Pashler (Ed.), *Encyclopedia of the mind*. SAGE Publications.

Pavlik Jr., P. I., Brawner, K. W., Olney, A., & Mitrovic, A. (2013). A Review of Learner Models Used in Intelligent Tutoring Systems In R. A. Sottilare, A. Graesser, X. Hu, & H. K.

Holden (Eds.), *Design Recommendations for Adaptive Intelligent Tutoring Systems: Learner Modeling* (Vol. 1, pp. 39-68). Army Research Labs/ University of Memphis.

Baker, R. S. J. d., Merceron, A., & Pavlik Jr., P. I. (2010). *Proceedings of the 3rd International Conference on Educational Data Mining*. International Educational Data Mining Society.

Pavlik Jr., P. I. (2007). Timing is an order: Modeling order effects in the learning of information. In F. E., Ritter, J. Nerb, E. Lehtinen, & T. O'Shea (Eds.), *In order to learn: How order effects in machine learning illuminate human learning* (pp. 137–150). Oxford University Press.

Peer-Reviewed Conference Reports (Short Papers and Poster Proceedings)

Pavlik Jr, P. I., Eglington, L., & Zhang, L. (2021). Automatic Domain Model Creation and Improvement. In C. Lynch, A. Merceron, M. Desmarais, & R. Nkambou (Eds.), *Proceedings of The 14th International Conference on Educational Data Mining* (pp. 672-676).

Pavlik Jr., P. I., & Eglington, L. (2021). Modeling the EdNet Dataset with Logistic Regression. In *35th AAAI Conference on Artificial Intelligence, Imagining Post-COVID Education with AI Workshp* (pp. 1-5).

Cao, M., Pavlik Jr, P. I., & Bidelman, G. M. (2019). Incorporating Prior Practice Difficulty into Performance Factor Analysis to Model Mandarin Tone Learning. In C. Lynch, A. Merceron, M. Desmarais, & R. Nkambou (Eds.), *Proceedings of the 11th International Conference on Educational Data Mining* (pp. 516-519).

Fang, Y., Shubeck, K. T., Lippert, A., Cheng, Q., Shi, G., Feng, S., Gatewood, J., Chen, S., Cai, Z., Pavlik Jr., P. I., Frijters, J. C., Greenberg, D., & Graesser, A. C. (2018). Clustering the Learning Patterns of Adults with Low Literacy Interacting with an Intelligent Tutoring System. In K. E. Boyer & M. Yudelson (Eds.), *Proceedings of the 11th International Conference on Educational Data Mining* (pp. 348-354). Educational Data Mining Society.

Pavlik Jr, P. I., Zimmerman, N., & Riedesel, M. (2018). Large Scale Search for Optimal Logistic Knowledge Tracing Features. In K. E. Boyer & M. Yudelson (Eds.), *Proceedings of the 11th International Conference on Educational Data Mining* (pp. 584-587). Educational Data Mining Society.

Fang, Y., Nye, B., Pavlik Jr., P. I., Xu, Y., Graesser, A., & Hu, X. (2017). Online Learning Persistence and Academic Achievement. In X. Hu, T. Barnes, A. Hershkovitz, & L. Paquette (Eds.), *Proceedings for the 10th International Conference on Educational Data Mining* (pp. 312-316).

Koedinger, K., Liu, R., Stamper, J., Thille, C., & Pavlik, P. (2017). Workshop: Community based educational data repositories and analysis tools. In *Proceedings of the Seventh International Learning Analytics & Knowledge Conference* (pp. 524-525). ACM.

Liu, R., Koedinger, K., Stamper, J., & Pavlik Jr., P. I. (2017). Workshop: Sharing and Reusing Data and Analytic Methods with LearnSphere. In X. Hu, T. Barnes, A. Hershkovitz, & L. Paquette (Eds.), *Proceedings for the 10th International Conference on Educational Data Mining* (pp. 475-476).

Shi, G., Pavlik Jr., P. I., & Graesser, A. (2017). Using an Additive Factor Model and Performance Factor Analysis to Assess Learning Gains in a Tutoring System to Help Adults with Reading Difficulties. In X. Hu, T. Barnes, A. Hershkovitz, & L. Paquette (Eds.), *Proceedings for the 10th International Conference on Educational Data Mining* (pp. 475-476).

Maass, J. K., & Pavlik Jr, P. I. (2016). Modeling the Influence of Format and Depth during Effortful Retrieval Practice. In T. Barnes, M. Chi, & M. Feng (Eds.), *The 9th International Conference on Educational Data Mining* (pp. 143-150).

Pavlik Jr., P. I., Kelly, C., & Maass, J. K. (2016). Using the mobile fact and concept training system (MoFaCTS). In A. Micarelli & J. Stamper (Eds.), *Proceedings of the 13th International Conference on Intelligent Tutoring Systems* (pp. 247-253). Springer.

Nye, B. D., Windsor, A., Pavlik Jr., P. I., Olney, A., Hajeer, M., Graesser, A. C., & Hu, X. (2015). Evaluating the Effectiveness of Integrating Natural Language Tutoring into an Existing Adaptive Learning System. In C. Conati, N. Heffernan, A. Mitrovic, & M. F. Verdejo (Eds.), *17th International Conference on Artificial Intelligence in Education* (Vol. 9112, pp. 743-747). Springer International Publishing. https://doi.org/10.1007/978-3-319-19773-9_106

Forsyth, C., Graesser, A., Pavlik Jr, P. I., Millis, K., & Samei, B. (2014). Discovering Theoretically Grounded Predictors of Deep vs. Shallow Level Learning. In J. Stamper, Z. A. Pardos, M. Mavrikis, & B. McLaren (Eds.), *Proceedings of 7th International Conference on Educational Data Mining* (pp. 229-232).

Forsyth, C., Graesser, A. C., Samei, B., Walker, B., & Pavlik Jr., P. I. (2014). Predicting performance behaviors during question generation in a game-like intelligent tutoring system. In J. Polman, A. Kyza, K. O'Neill, & I. Tabak (Eds.), *Proceedings of the International Conference of Learning Sciences* (pp. 1611-1612). International Society of the Learning Sciences.

Forsyth, C. M., Graesser, A. C., Walker, B., Millis, K., Pavlik Jr., P. I., & Halpern, D. (2013). Didactic Galactic: Types of Knowledge Learned in a Serious Game. In H. C. Lane, K. Yacef, J. Mostow, & P. Pavlik (Eds.), *Artificial Intelligence in Education* (Vol. 7926, pp. 832-835). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-39112-5_124

Maass, J. K., & Pavlik Jr., P. I. (2013). Utilizing Concept Mapping in Intelligent Tutoring Systems. In H. C. Lane, K. Yacef, J. Mostow, & P. Pavlik (Eds.), *Artificial Intelligence in Education* (Vol. 7926, pp. 880-883). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-39112-5_136

Pavlik Jr., P. I., Hua, H., Williams, J., & Bidelman, G. M. (2013). Modeling and Optimizing Forgetting and Spacing Effects during Musical Interval Training. In S. K. D'Mello, R. A. Calvo, & A. Olney (Eds.), *Proceedings of the 6th International Conference of Educational Datamining* (pp. 145-152).

Forsyth, C. M., Pavlik Jr., P. I., Graesser, A. C., Cai, Z., Germany, M.-l., Millis, K., Butler, H., Halpern, D. F., & Dolan, R. P. (2012). Learning gains for core concepts in a serious game on scientific reasoning. In K.Yacef, O. Zaïane, H. Hershkovitz, M. Yudelson, & J. Stamper (Eds.), *Proceedings of the 5th International Conference on Educational Data Mining* (pp. 172-175). International Educational Data Mining Society.

Pavlik Jr., P. I., Maass, J. K., Rus, V., & Olney, A. M. (2012). Facilitating Co-adaptation of Technology and Education through the Creation of an Open-source Repository of Interoperable Code. In S. A. Cerri, W. J. Clancey, G. Papadourakis, & K.-K. Panourgia (Eds.), *Proceedings of the 11th International Conference on Intelligent Tutoring Systems* (pp. 677-678). Springer.

Pavlik Jr., P. I., & Wu, S. (2011). A dynamical system model of microgenetic changes in performance, efficacy, strategy use and value during vocabulary learning. In M. Pechenizkiy, T. Calders, C. Conati, S. Ventura, C. Romero , & J. Stamper (Eds.), *Proceedings of the 4th International Conference on Educational Data Mining* (pp. 277–282).

Pavlik Jr., P. I., Yudelson, M., & Koedinger, K. R. (2011). Using contextual factors analysis to explain transfer of least common multiple skills. In G. Biswas, S. Bull, J. Kay, & A. Mitrovic (Eds.), *15th International Conference Artificial Inteligence in Education* (Vol. 6738, pp. 256–263). Springer. https://doi.org/http://doi:10.1007/978-3-642-21869-9_34

Yudelson, M., Pavlik Jr., P. I., & Koedinger, K. R. (2011). Towards better understanding of transfer in cognitive models of practice. In M. Pechenizkiy, T. Calders, C. Conati, S. Ventura, C. Romero , & J. Stamper (Eds.), *Proceedings of the 4th International Conference on Educational Data Mining* (pp. 373–374).

Pavlik Jr., P. I. (2010). Data Reduction Methods Applied to Understanding Complex Learning Hypotheses. In R. S. J. d. Baker, A. Merceron, & P. I. Pavlik Jr. (Eds.), *Proceedings of the 3rd International Conference on Educational Data Mining* (pp. 311-312).

Pavlik Jr., P. I., & Anderson, J. R. (2004). An ACT-R model of memory applied to finding the optimal schedule of practice. In M. Lovett, C. Schunn, C. Lebiere, & P. Munro (Eds.), *Proceedings of the Sixth International Conference of Cognitive Modeling* (pp. 376-377). Carnegie Mellon University/University of Pittsburgh.

Non-peer-reviewed publications

Cao, M., & Pavlik Jr, P. I. (2019). Using a Variant of the Performance Factors Analysis Model for Adaptive Training on Mandarin Tones. Third International Conference on Artificial Intelligence and Adaptive Education 2019, Beijing, China.

Pavlik Jr., P. I., Cao, M., & Eglington, L. (2019). *Mathematically Modeling the Optimal Desirable Difficulty.* 60th Annual Meeting of the Psychonomic Society, Montreal, Canada.

Barideaux Jr., K. J., & Pavlik Jr., P. I. (2016, November). Examining the Effects of Studying with Music: Turn off the Verbal Music, Unless You're Studying a Concept Map. 57th Annual Meeting of the Psychonomic Society, Chicago.

Maass, J. K., & Pavlik Jr., P. I. (2016, November). Discerning Misconceptions through Retrieval Practice. 57th Annual Meeting of the Psychonomic Society, Chicago.

Pavlik Jr., P. I., Maass, J. K., & Hua, H. (2015, November). Redundancy causes spacing effects. 56th Annual Meeting of the Psychonomic Society, Chicago.

Medimorec, S., Schaffer, K. V., Pavlik Jr, P. I., Olney, A., Graesser, A. C., & Risko, E. F. (2014, December). The Language of Lectures: Offsetting Challenging Words. In *Canadian Journal of Experimental Psychology* (Vol. 68, pp. 257-257). Canadian Psychological Society.

Forsyth, C. M., Graesser, A. C., Cai, Z., Pavlik Jr., P. I., Millis, K., & Halpern, D. (2013, April). *Learner profiles emerge from a serious game teaching scientific inquiry* Annual Meeting of the American Educational Research Association., San Francisco, CA.

Forsyth, C. M., Millis, K., Pavlik Jr., P. I., & Graesser, A. C. (2013, April). *Assessing performance metrics within a serious game* Annual Meeting of the American Educational Research Association., San Francisco, CA.

Barideaux Jr., K. J., Maass, J. K., & Pavlik Jr., P. I. (2013). A Comparison of Concept Maps and Text Summaries: The Benefits for Learning and Transfer. 54th Annual Meeting of the Psychonomic Society, Toronto.

Pavlik Jr, P. I., Hua, H., Williams, J., & Bidelman, G. M. (2013, July 6–9). *Modeling the effect of spacing on musical interval training* Proceedings of 6th International Conference on Educational Data Mining, Memphis, TN.

Pavlik Jr., P. I., Yudelson, M., & Koedinger, K. R. (2011). A method for the microanalysis of pre-algebra transfer. Society for Research on Educational Effectiveness: Fall, Washington DC.

Pavlik Jr, P. I., Cen, H., & Koedinger, K. R. (2009). Performance factors analysis: A new alternative to knowledge tracing. 14th International Conference on Artificial Intelligence in Education, Brighton, England.

Pavlik Jr., P. I., & Koedinger, K. R. (2009). Understanding the advantages of retrieval for long-term retention using modeling. 50th Annual Meeting of the Psychonomic Society, Boston.

Pavlik Jr., P. I. (2008). Classroom testing of a discrete trial practice system. 34th Annual Meeting of the Association for Behavior Analysis, Chicago.

Pavlik Jr., P. I., Cen, H., Wu, L., & Koedinger, K. R. (2008). Automatic determination of skill models from existing tutor data. Institute of Education Science Research Conference, Washington, D.C.

Pavlik Jr., P. I., Presson, N., & Hora, D. (2008). Using the FaCT System (Fact and Concept Training System) for Classroom and Laboratory Experiments. Inter-Science Of Learning Center Conference, Pittsburgh, PA.

Pavlik Jr., P. I. (2007). *Understanding why practice should be fast and accurate* 33rd Annual Meeting of the Association for Behavior Analysis, San Diego, CA.

Pavlik Jr., P. I. (2006a). Transfer effects in Chinese vocabulary learning. In R. Sun (Ed.), *Proceedings of the Twenty-Eighth Annual Conference of the Cognitive Science Society* (pp. 2579). Lawrence Erlbaum.

Pavlik Jr., P. I. (2006b). *Understanding the effectiveness of direct instruction methods* 24th Annual Meeting of the California Association for Behavior Analysis, Burlingame, CA.

Pavlik Jr., P. I., & Anderson, J. R. (2004, November). Optimizing Paired-Associate Learning. 45th Annual Meeting of the Psychonomic Society, Minneapolis, MN.

Pavlik Jr., P. I. (2004). *A PDP Model of Spacing Effects in Memory* 22nd Annual Pittsburgh-CMU Psychology Conference, Pittsburgh, PA.

Pavlik Jr., P. I., & Anderson, J. R. (2004). The memory consequences of study after successful recall. In K. D. Forbus, D. Gentner, & T. Regier (Eds.), *Proceedings of the Twenty-Sixth Annual Conference of the Cognitive Science Society* (pp. 1615). Lawrence Erlbaum.

Pavlik Jr., P. I., & Anderson, J. R. (2002). Mental rotation transfer. In W. D. Gray & C. Schunn (Eds.), *Proceedings of the Twenty-Fourth Annual Conference of the Cognitive Science Society* (pp. 1029). Lawrence Erlbaum Associates.

Pavlik Jr., P. I., & Burns, S. (2001). *Learning Mental Rotation: Exemplar Learning or Process Learning* Midwestern Psychological Association, Chicago, IL.

Devices/Software Applications

Pavlik Jr, P. I., & Eglington, L. G. (2021). *LKT: Logistic Knowledge Tracing.* In *CRAN* R package version 1.0.

Invited Presentations

2019 Instructional engineering for personalized adaptive practice systems. EdCrunch 2019 (keynote talk), Moscow, Russia.

2015 Ingredients for a theory of instruction Rice Workshop on Personalized Learning, Rice University, Houston, Texas.

2010 Integrating perceptual factors into applied learning research. In E. Albro (Ed.), Symposium: Perceptual Characteristics and Concept Mastery: What Makes a Difference? American Psychology Association 22nd Annual Convention.

2010 6th Annual PSLC LearnLab Summer School, In-Vivo Experimentation Track Lectures

2009 University of Phoenix's National Research Center “Optimizing the practice schedule”

2007 Department of Modern Languages, Carnegie Mellon University, Graduate Seminar "Using a Cognitive Model to Schedule Vocabulary Practice for Second Language Learners"

2006 Department of Educational and School Psychology and Special Education, Pennsylvania State University "Using Cognitive Theory and Computational Modeling to Explain the Success of Direct Instruction and Precision Teaching"

2004 Department of Psychology, Northern Michigan University "Optimizing Paired-Associate Learning by Paying Attention to Individual and Item Differences."

2003 Tenth Annual ACT-R Summer School, Carnegie Mellon Univ. "Unit 7: Base-Level Activation."

2002 Department of Psychology, Northern Michigan University "Paired-Associate Practice and Forgetting."

Workshops

Koedinger, K., Stamper, J., & Pavlik Jr., P. I. (2020). Reproducibility and Replication of Analytic Methods with LearnSphere. In *EDM 2020 Tutorials*.

Koedinger, K., Stamper, J., Carvalho, P., Pavlik Jr., P. I., & Eglington, L. (2019). Sharing and Reusing Data and Analytic Methods with LearnSphere. In *EDM 2019 Tutorials*.

Stamper, J., Koedinger, K., Rose, C., & Pavlik Jr., P. I. (2018). Sharing and Reusing Data and Analytic Methods with LearnSphere. In *LAK 2018 Workshops*.

Koedinger, K., Liu, R., Stamper, J., Thille, C., Pavlik Jr., P. I., & O'Reilly, U.-M. (2017). Community-Based Educational Data Repositories and Analysis Tools. In *LAK 2017 Workshops*.

Stamper, J., Koedinger, K., Pavlik Jr., P. I., Rose, C., Liu, R., Eagle, M., Yudelson, M., & Veeramachaneni, K. (2016). Educational data analysis using LearnSphere workshop. In J. Rowe & E. Snow (Eds.), *Proceedings of the EDM 2016 Workshops and Tutorials co-located with the 9th International Conference on Educational Data Mining*. http://ceur-ws.org/Vol-1633/

Academic Service

Department

Diversity, Equity, and Inclusion Department Committee	2018-current
Cognitive Psychology Hiring Committee Chair	2021
Gradschoolmatch.com coordinator	2015-2018
SONA (Psychology Subject Pool) administrator	2012-2013

University

Center for Research and Innovation in STEM Teaching and Learning (CRISTAL) Representative for Institute of Intelligent Systems	2012-2017
ACAD (College Readiness Course) University Planning Committee	2014

Professional Memberships

Cognitive Science Society	2002–2011
Association for Behavior Analysis	2007-2008
Psychonomic Society	2007-2009, 2013-current

International Artificial Intelligence in Education Society	2008-current
International Educational Data Mining Society	2008-current

Editorial Responsibilities

Transactions on Learning Technologies, Associate Editor	2014-2019
Journal reviewer: Archives of Scientific Psychology, Perceptual and Motor Skills, Applied Cognitive Psychology, Developmental Science, PLOS ONE, Journal of Experimental Psychology: General, Cognitive Science, Journal of Machine Learning Research (KDD cup issue), Journal of Educational Data Mining, International Journal of Artificial Intelligence in Education, Learning and Instruction, Journal of Experimental Psychology: Applied, Memory, and Cognition, Journal of Educational Psychology, User Modeling, and User-Adapted Interaction, Learning and Instruction, Transactions on Learning Technologies	Various
Conference reviewer: International Conference on Artificial Intelligence in Education, Memphis, 6th International Conference on Educational Data Mining, Memphis, Cognitive Science Conference, Society for Research in Educational Effectiveness, Proceedings of the National Academy of Sciences, International Conference of Cognitive Modeling, Cognitive Science Society Conference, International Conference of Educational Data Mining, International Conference on Development and Epigenetic Robotics, ACM Conference on Human Factors in Computing Systems (CHI), Artificial Intelligence in Education (AIED) Conference, Works in Progress Symposium (UofM)	Various

Recommenders

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