Mina C. Johnson-Glenberg, Ph.D.

Research Professor
Arizona State University
Department of Psychology, Tempe, AZ, USA
https://psychology.clas.asu.edu/research/labs/embodiedgames

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Education

1996-98	University of Colorado, Boulder, CO
	Ph.D., Cognitive Psychology
1993-96	University of Colorado, Boulder, C
	M.A., Cognitive Psychology
1983	University of Tuebingen, Tuebingen, Germany
1980-84	Antioch College, Yellow Springs, Ohio
	B.A., Film and Video Production/German

Recent Employment

2016-	**Research Professor** at Arizona State University, USA
2015 -2016	**Associate Professor (Universitair Hoofddocent)** at Radboud University Nijmegen, The Netherlands
2009- 2015	**Associate Research Professor** at Arizona State University, USA
2013-	**President/Founder** *Embodied* Games, LLC registered in Arizona www.embodied-games.com
2011-2013	**Chief Learning Officer/Co-Founder** at *SMALLab Learning LLC*, a spinout company from ASU
2001- 2008	**President** of educational software design company, *The NeuronFarm, LLC*
2000- 2003	**Assistant Research Scientist** at the Waisman Center, University of Wisconsin-Madison. Research specialties included literacy, neural network modeling, and design of computer-aided instruction

Honors and Awards

7/15	**INTEL GoToMarket Campaign –** In-kind marketing funds from *RealSense* sensor campaign
8/13	**Obesity Challenge Award** - ASU and Mayo Clinic Grant for game to further obesity solutions
6/11	**Venture Award** - Catalyst Venture Award Grant from AzTE (Arizona Technology Enterprises) at ASU
4/03-06	**Board of Directors** - **State of Wisconsin Literacy Foundation**, Madison, WI
5/04	**Governor's Business Plan Competition** - Honorable mention prize money
5/04	**2 WISBIC Technology Innovation Awards** for outstanding achievements, Wisconsin Small Business Innovation Consortium
5/03	**WISBIC Technology Innovation Award** for outstanding achievement, Wisconsin Small Business Innovation Consortium
02-9/03	**NIH Loan Repayment Program** recipient for Outstanding Pediatric Research
9/01	**WISBIC Technology Innovation Award** for outstanding achievement, Wisconsin Small Business Innovation Consortium
98 - 00	**NICHD Post-doctoral Research Fellowship** - Waisman Center, University of Wisconsin-Madison
3/99	**Theodore Tjossem Post-Doctoral Fellow Award**
4/97	**University of Colorado - Dean's Grant Award** for dissertation research
7/96	**University of Oxford, England – St. John's College-** scholarship to attend Neural Network-Connectionist summer school in Oxford, England

Professional Societies, Consultancies and Other

Board of Advisors - Currently on:

Center for Gender Equity in Science and Technology at ASU https://cgest.asu.edu/

Co-Author -   Latest SRA Reading program (FLEX Literacy) from MacMillan McGraw-Hill (released January 2013)
VR and STEM Education series for NetDragon, LTD (2017- ongoing)

Member-   American Educational Research Association (AERA)
ARIEL-SIG, Special Interest Group - Applied Research in Virtual Environments for Learning
Wisconsin Literacy Foundation (Board of Directors, Ex Officio)
Society for the Scientific Study of Reading (SSSR)

Leadership and Review Experience
Chair - Future of Education in Virtual and Augmented Reality – FEVAR Special Interest Group, Monthly meetup at ASU, 2017 onwards **-** https://fevar.eventbrite.com/

Consulting Editor, *Journal of Educational Psychology***; frequent reviews for the journals** *Games for Health Journal; Frontiers in Psychology*

Arizona State University OKED Leadership Academy – Nomination required

Ex-Chair - ASU Provost's Committee on Excellence in Digital Teaching and Learning

National Institutes of Health (NIH) - Multiple Review Panels for SBIR (Small Business Innovative Research) Awards

NSF (National Science Foundation) Review panels

SIIA (Software and Information Industry Association) CODiE Awards judge multiple years

Selected Publications

M.C. Johnson-Glenberg, (2018). Immersive VR and education: Embodied design principles that include gesture and hand controls*. Frontiers in Robotics and AI*, 5, 81. Open source https://doi.org/10.3389/frobt.2018.00081

Poppelaars, A., Scholten, H., Granic, I, Veling, H., Johnson-Glenberg, M.C., & Luijten, M. (2018). When winning is losing: A randomized controlled trial testing a video game to train food-specific inhibitory control. *Appetite*, 129, 143-154. https://doi.org/10.1016/j.appet.2018.06.039. (http://www.sciencedirect.com/science/article/pii/S0195666317317592)

Hermans, R.C. J, van den Broek, N., Nederkoorn, C., Otten, R., Ruiter, E.L.M., & Johnson-Glenberg, M. C. (2018). Feed the Alien! The effects of a nutrition instruction game on children's nutritional knowledge and food intake. Games for Health Journal, 7, 3, 164-174.

Johnson-Glenberg, M. C. (2017). Embodied education in mixed and mediated realities: Principles for content design. Chapter in D. Liu, C. Dede, and R. Richards (Eds.), *Virtual, Augmented, and Mixed Realities in Education.* Series: New Frontiers of Educational Research, Springer, Verlag. ISBN 978-981-10-5490-7.

Johnson-Glenberg, M. C., & Megowan-Romanowicz, C. (2017). Embodied science and mixed reality: How gesture and motion capture affect physics education. *Cognitive Research: Practices and Implications.* 2, 24. 10.1186/s41235-017-0060-9. https://cognitiveresearchjournal.springeropen.com/articles/10.1186/s41235-017-0060-9

Badilla, M.G., Johnson-Glenberg, M. C., Galindo, J., Revuelta, F., & Pedrera, I. (2017, June). *Promoting nutrition with videogames as a support of science education curriculum*. International Workshop on Gamification and Games for Learning. Gamilearn 2017, Tenerife, Spain.

Johnson-Glenberg, M. C. Birchfield, D., Megowan-Romanowicz, C. & Savio-Ramos, C. (2016). Effects of embodied learning and digital platform on the retention of physics content: Centripetal force. *Frontiers in Psychology*. http://dx.doi.org/10.3389/fpsyg.2016.01819 OpenSource.

Johnson-Glenberg, M. C., Birchfield, D., Megowan-Romanowicz, C., & Snow, E. L. (2015). If the gear fits, spin it! Embodied education and in-game assessments. *International Journal of Gaming and Computer-based Simulations. 7, 4*.

Johnson-Glenberg, M.C., Savio-Ramos, C., & Henry, H. (2014). "Alien Health": A Nutrition Instruction Exergame using the *Kinect* Sensor. *Games for Health Journal*. Open Access. http://online.liebertpub.com/doi/pdfplus/10.1089/g4h.2013.0094

Johnson-Glenberg, M. C., Savio-Ramos, C., Perkins, K.K., Moore, E.B., Robb Lindgren, R., Clark, D., Brady, C., Sengupta, P., Martinez-Garza, M., Killingsworth, S., Adams, D., Gaydos, M., Barany, A., & Squire, K. (2014). Science Sims and Games: Best Design Practices and Fave Flops. *Proceedings from the International Conference of the Learning Sciences (ICLS): Learning and becoming in practice,* Boulder, CO. 3, 1201-1202. June 2014.

Johnson-Glenberg, M. C. (2014). Embodied Cognition for Education. In Denis, P. (Ed*.) Encyclopedia of Educational Theory and Philosophy*. Sage Publications.

Johnson-Glenberg, M. C., Birchfield, D. A., Tolentino, L., & Koziupa, T. (2013).Collaborative Embodied Learning in Mixed Reality Motion-Capture Environments: Two Science Studies. *Journal of Educational Psychology. 106, 1*, 86-104. doi: 10.1037/a0034008

Lindgren, R. & Johnson-Glenberg, M. C. (2013). Emboldened by Embodiment: Six Precepts regarding the Future of Embodied Learning and Mixed Reality Technologies. *Educational Researcher. 42, 8*, 445- 452. doi: 10.3102/0013189X13511661

Johnson-Glenberg. M. C., & Hekler, E. (2013). Alien health game: An embodied, exergame to instruct in nutrition and *MyPlate* . *Games for Health Journal: Research, Development, and Clinical Applications, 2, 6*, 354-361. http://online.liebertpub.com/doi/full/10.1089/g4h.2013.0057. doi: 10.1089/g4h.2013.0057.

Johnson-Glenberg, M. C., & the EGL Lab Group. (2013). Using motion sensing for learning: A serious nutrition game. In R. Shumaker (Ed.): Human Computers and Interactions International *VAMR/HCII 2013, Part II,* LNCS 8022, . 380–389. Springer-Verlag Berlin Heidelberg.

Johnson-Glenberg, M.C. (2012). What is Learning in a Mixed Reality Environment and What Does an "Embodied Lesson" mean. November, 2012. ARIELSig, Special Augmented Reality Group at AERA. Supernews.

Cohen, T., Portiz, P., Kahol, K., MacKenzie, J. Olson, C., Johnson-Glenberg, M., & Patel, V. (2012). Avatar–Based Simulation in the Evaluation of Diagnosis & Management of Mental Health. Disorders in Primary Care. *Journal of Biomedical Informatics*. doi: 10.1016/j.jbi.2012.07.009

Abrahamson, D., Black, J. B., DeLiema, D. J., Enyedy, N., Hoyer, D., Fadjo, C. L., Gutiérrez, J. F., Martin, H. T., Petrick, C. J., Steen, F. F., Trninic, D. Johnson-Glenberg, M. C. (2012). In D. Abrahamson (Chair & Organizer). You're

it! Body, action, and object in STEM learning. *Proceedings of the International Conference of the Learning Sciences: Future of Learning (ICLS)* (Vol. 1, pp. 283-290). Sydney: University of Sydney / ISLS.

Johnson-Glenberg, M. C., Birchfield, D., Koziupa, T., Savio-Ramos, C. & Cruse , J. (July, 2012). *Seeing It versus Doing It: Lessons from Mixed Reality STEM Education. Proceedings of the International Conference for the Learning Sciences (ICLS),* 2, Sydney, Australia.

Johnson Glenberg, M.,C. & Cruse, J. (June, 2012) Serious Games in Technology-enabled Embodied Learning Environments: Two Games for Health with the Kinect. *Proceedings from Games Learning and Society (GLS).* Madison, WI.

Johnson-Glenberg, M. C. & the EGL Group (Embodied Games for Learning). (April, 2012). Learning in the K-12 Classroom: a Taxonomy. Symposium and Proceedings from the Annual Conference of the *American Education Research Association (AERA)*, Vancouver, British Columbia.

Johnson-Glenberg, M. C., Koziupa, T., Birchfield, D. & Li, K., (2011). Games for Learning in Embodied Mixed-Reality Environments: Principles and Results. *Proceedings for Games, Learning, and Society Conference*, Madison, WI.

Johnson-Glenberg, M. C., Birchfield, D., Savvides, P., & Megowan-Romanowicz, C. (2011). Semi-virtual Embodied Learning – Real World STEM Assessment. In L. Annetta & S. Bronack (eds.) *Serious Educational Game Assessment: Practical Methods and Models for Educational Games, Simulations and Virtual Worlds*. pp. 241-258. Rotterdam: Sense Publications.

Birchfield, D., & Johnson-Glenberg, M. C. (2010). A next gen Interface for embodied learning: *SMALLab* and the geological layer cake. *International Journal of Gaming and Computer-mediated Simulation*, *2*, 1, 49-58.

Johnson-Glenberg, M. C. (2010). Embedded Formative e-Assessment: Who Benefits, Who Falters? *Educational Media International*, 47, 2, 153-171.

Birchfield, D., Campana, E., Hatton, S., Johnson-Glenberg, M., Kelliher, A., Olson, L., Martinez, C. Savvides, P. & Tolentino, L. (2009). Embodied and mediated learning in SMALLab: A student-centered mixed-reality environment. *ACM SIGGRAPH Emerging Technologies, SIGGRAPH*.

Johnson-Glenberg, M. C., Birchfield, D., & Uysal, S. (2009). *SMALLab*: Virtual Geology Studies using Embodied Learning with Motion, Sound, and Graphics. *Educational Media International, 46*, 4, 267-280.

Johnson-Glenberg, M. C., Birchfield, D., Megowan-Romanowicz, C., Tolentino, L., & Martinez, C. (2009). Embodied Games, Next Gen Interfaces, and Assessment of High School Physics. *International Journal of Learning and Media*, 1, 2. Access at http://ijlm.net/node/12813

Tolentino, L., Birchfield, D., Megowan-Romanowicz, C., Johnson-Glenberg, M. C., Kelliher, A., & Martinez, C. (2009). Teaching and learning in the mixed-reality science classroom. *Journal of Science Education and Technology. 18, 6*, 501-517. doi: 10.1007/s10956-009-9166

Buckley, S., & Johnson-Glenberg, M. C. (2008). Increasing literacy learning for individuals with Down syndrome and fragile X syndrome. In S.F. Warren & M.E. Fey (Series Eds.) & J.E. Roberts, R.S. Chapman, & S.F. Warren (Vol. Eds.*), Communication and language intervention series: Speech and language development and intervention in Down syndrome and fragile X syndrome* (pp. 233-254). Baltimore: Paul H. Brookes Publishing Co.

Johnson-Glenberg, M. C. (2007b). Web-based Reading Comprehension Instruction: Three studies of 3D-Readers. In D. McNamara (ed.) *Reading Comprehension Strategies: Theory, Interventions, and Technologies.* Mahwah, New Jersey: Lawrence Erlbaum Publishers.

Johnson-Glenberg, M. C. (2005) Web-based training of metacognitive strategies for text comprehension: Focus on poor comprehenders. *Reading and Writing: An Interdisciplinary Journal. 18:1 - 33,* 755-786.

Johnson-Glenberg, M. C., & Chapman, R. S. (2004). Predictors of parent-child linguistic tuning and label requests during play: A comparison between children who are typically developing and individuals with Down syndrome. *Journal of Intellectual Disabilities Research,* 48, 3, 225-238.

Johnson-Glenberg, M. C. (2000). Training reading comprehension in adequate decoders/poor comprehenders: Verbal vs. visual strategies. *Journal of Educational Psychology,* 92, 4, 772-782.

Glenberg, A.M., Robertson, D.A., Jansen, J.L., & Johnson-Glenberg, M. C. (1999) Not propositions. *Journal of Cognitive Systems Research,* 1, 1-15.

Wise B. K., Olson, R.K., Ring, J., & Johnson, M. C. (1997). Computer-based remedial training in phoneme awareness and phonological decoding: Effects on post-training development of word recognition. *Scientific Studies of Reading,* 1, 3, 235-253.

Other: Selected Invited Addresses, Blogs, Workshops

Johnson-Glenberg, M. C. (2018, April). Design guidelines for VR with hand controls. CAVES consortium at Clemsom University. Clemson, S.C.

Johnson-Glenberg, M. C. (2017, September). Emerging Embodied Technologies and VR for Learning at EARLI (European Association for research on Learning and Instruction). Symposium called *Motivation, Affect, and Body in Instructional Design*. Tampere, Finland.

Johnson-Glenberg, M.C. (January, 2017). Embodied Science Guidelines. Presented at Harvard workshop on Virtual Reality and Education. Presenter and chapter to be published Spring of 2017. Cambridge, MA.

Johnson-Glenberg, M.C. (December, 2016). "Platform effects of viewing various formats including IMAX". Presented at stakeholder *grant meeting at Pacific Science Center (NSF AISL)*. Seattle, WA.

Johnson-Glenberg, M.C. (June, 2016). Knowledge Acquisition using the Body in VR Environments. Presented at conference called *Corps, Cognition, and Connaissances.* Sorbonne University, Paris, France.
http://kinesthesie.canalblog.com/archives/2016/10/21/34466713.html

Games for Health European Conference. (November, 2015). Nutrition Knowledge Change from an Embodied *Kinect* Game: *Alien Health*". Utrecht, The Netherlands.

Larger Research Grants Dr. Johnson Glenberg has been the PI (or co-PI) on over $8,300,000 in grant funds.

Current:
Amazon Adventure: IMAX Movie and Computer Game as Assessment
NSF AISL   Project Period 1/2016 – 12/2018   Role: Co-PI
National Science Foundation   Funding Amount $3,000,000

Advancing Informal STEM Learning mechanism. In charge of creating a natural selection game that will serve as an assessment and standalone game in museums/schools.

Past Grants:
Embodied STEM learning across technology-based learning environments   Role: PI
NSF DR K-12 Grant.   Project Period: July 2010 – 2016 (NCE)
National Science Foundation   Funding Amount: $2,526,000
This study addresses two central research questions: 1) how are knowledge gains impacted by the degree of embodiment designed into technology-based learning environments, and 2) to what extent do the affordances of the different environments constrain or support embodied learning of STEM topics.

Obesity Challenge Award   Role: PI
ASU Internal Grant from Obesity Solutions Office   Funding Amount $12,000
We will create an innovative exer-game for youth at risk – teaching them about nutrition and healthy food choices in an inspiring game using the Microsoft *Kinect* skeletal tracking sensor. July 2013-2014

EDUCAUSE: Next Generation Learning Challenges Grant, Gates Foundation   Role: PI
Wave II. *STEM Learning with Embodied Content*
Project period: July 2011 – September 2012   Funding Amount $500,000
Dr. Johnson led the design team and created all assessments on a motion capture tech study using the *KINECT* to instruct middle school students in simple machines (Gears and Levers).

MacArthur Foundation Digital Media Award   Role: Co-PI
8/2008 – 7/2010   Funding Amount $300,000.
Situated Multimedia Arts and Language Learning (SMALLab).
Researching efficacy of Mixed Reality learning system on STEM content in high school settings.

Department of Education, National Institute for Student Achievement, C and A. Role*:* PI
11/ 2004 - 2006.   Phase II   Funding Amount $750,000
Training the Tutors: e-modules. SBIR (Small Business Innovative Research)
Duties included creating and overseeing the design and deployment of a suite of modules to train literacy volunteers who work with at-risk readers. Several publications resulted addressing issues of interactivity and quizzes.

National Institute of Child Health and Human Development at NIH.
SBIR (Small Business Innovative Research)   Phase II   Role: PI
July 2003 through March 2005   Funding Amount $880,000
3D-Readers: Software for Training Reading Comprehension.
Created the company the *NeuronFarm* to commercialize *3D-Readers* the Web-based software to teach at-risk middle school readers metacognitive reading strategies. Dr. Johnson-Glenberg's duties were those associated with being the President/CEO of a small hi-tech, educational software company - managing employees, editing all story and marketing content, business development, overseeing all financials, and legal issues, setting up in-school efficacy studies, pitching to angels, and analyzing all efficacy statistics.

National Institute of Child Health and Human Development (NICHD), MRDD, HD 39362-01A
RO3   Role: PI
June 2001 through May 2004   Funding Amount $390,000
Fragile X Working Memory: A Neural Network Model. RO3 Grant. Duties included recruiting participants, designing measures, gathering data, and creating a computational model of working memory and literacy skills in individuals with fragile X syndrome (the most prevalent form of heritable mental retardation in the world).

Other skills:

Educational Game Designer - Dr. Johnson-Glenberg designed the majority of the games and simulations on the company website. This is the only website in the country to offer free embodied STEM education games to schools and individuals: www.embodied-games.com.

Co-author on the digital experiences in the *SRA FLEX Literacy* program from McGraw-Hill. https://www.mheducation.com/prek-12/program/microsites/MKTSP-RBT01M0/intervention.html

XR for Education Consultant with *Net Dragon*, the he largest gaming company in China. http://www.netdragon.com/

Entrepreneur - Dr. Johnson-Glenberg has started three companies since 1999. Currently, she is the President of a university spinout company called *Embodied Games*, LLC. www.embodied-games.com. The company creates and distributes innovative science games, several of them funded by the National Science Foundation (NSF). The user interfaces are unique in that they are embodied and integrate gesture and kinesthetics. The team has been on the forefront of using the body to help youth learn science, technology, engineering and math (STEM). The games incorporate either immersive VR, the Microsoft *Kinect* sensor, Intel's *RealSense* sensor, or *OptiTrack* motion capture IR cameras. A previous company she to co-founded, called *SMALLab Learning*, LLC uses a Mixed Reality (MR) platform for K-12 education, www.smallablearning.com.

Inventor - She has created several natural language processing algorithms to score the quality of constructed text. She is a behavioral statistician who also uses artificial intelligence (AI) in some of her work. She has created several neural networks for text scoring and to model intellectual disabilities. Recently, she created a tablet-based assessment that uses touch and gesture to assess physics knowledge. See *Wacom* references in the 2017 article http://rdcu.be/sZw7