

Mina C. Johnson-Glenberg, Ph.D.

Research Professor
Arizona State University
Department of Psychology, Tempe, AZ, USA
Mina.Johnson@asu.edu

<https://psychology.asu.edu/research/labs/embodied-games-lab>

President, *Embodied Games, LLC*
www.embodied-games.com

<https://www.linkedin.com/in/mina-johnson-5b192a17>

Education

1998-2000 University of Wisconsin- Madison, The Waisman Center, Madison, WI
Post-doctoral Fellow
1996-98 University of Colorado, Boulder, CO
Ph.D., Cognitive Psychology
1993-96 University of Colorado, Boulder, CO
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*, 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, USA

Honors and Awards

9/19 **ASURE VR Challenge** – ASU competitive grant for AR/VR product for social good (*Ebola App*)
7/15 **Intel Corp. GoToMarket Campaign** – In-kind marketing funds from *RealSense* sensor campaign
8/13 **Obesity Challenge Award** - ASU and Mayo Clinic grant for Alien Health Nutrition Game
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 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/>

Baltu Studios in Tempe, AZ <https://www.baltustudios.com/>

Co-Author - SRA Reading program (FLEX Literacy) from **MacMillan McGraw-Hill**
VR and STEM Education Consultant for **NetDragon, LTD** (2017-2019)

Member- AERA - American Educational Research Association
Wisconsin Literacy Foundation (Board of Directors, Ex Officio)
iLRN – Immersive Learning Research Network
VR for Good – Monthly XR meetup in Phoenix

Leadership and Review Experience

Chair - Future of Education in Virtual and Augmented Reality – FEVAR Special Interest Group, Monthly meetup at ASU, 2017 onwards - <https://psychology.asu.edu/fevar>

Frequent Reviews for: *Journal of Educational Psychology*; *Games for Health Journal*; *Frontiers in Psychology*; *Human Computer Interaction*

Arizona State University OKED Leadership Academy, 2016 – Nomination required

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

NSF (National Science Foundation) – Yearly Review panels

SIIA (Software and Information Industry Association) CODiE Awards - Judge for multiple years

Selected Publications

Vieyra, R. E., Megowan-Romanowicz, C., O'Brien, D. J., Vieyra, C., & Johnson-Glenberg, M. C. (2023). Harnessing the Digital Science Education Revolution: Smartphone Sensors as Teaching Tools. In J. Trumble, S. Asim, J. Ellis, & D. Slykhuis (Eds.), *Theoretical and Practical Teaching Strategies for K-12 Science Education in the Digital Age* (pp. 131-152). IGI Global. <https://doi.org/10.4018/978-1-6684-5585-2.ch008>

Johnson-Glenberg, M. C., Kosa, M. and O'Rourke H. P. (2022). STEM learning, science identity and immersivity: Giant screen films comparing 2D, 3D, and dome formats including a videogame assessment. *Front. Educ.* 7:1096889. 10.3389/educ.2022.1096889

Johnson-Glenberg, M. C. (2022). Evaluating Embodied Immersive STEM VR: Quality of Education in Virtual Reality Rubric (QUIVRR). S. L. Macrine and J. Fugate (Eds.) *Movement Matters: How Embodied Cognition Informs Teaching and Learning*. Cambridge, MA: The MIT Press.

Ulrich, M., Evans, B., Liu, F. W., Johnson-Glenberg, M. C., & LiKamWa, R. (2021). AR-some Chemistry Models: Interactable 3D Molecules through Augmented Reality. MobileHCI '21 Adjunct: Adjunct Publication of the 23rd International Conference on Mobile Human-Computer Interaction. 20, 1-4. <https://doi.org/10.1145/3447527.3474874>

- Johnson-Glenberg, M. C., Bartolomea, H., & Kalina, E. (2021). Platform is not destiny: Embodied learning effects comparing 2D desktop to 3D virtual reality STEM experiences. *Journal of Computer Assisted Learning*. <https://onlinelibrary.wiley.com/doi/10.1111/jcal.12567>
- Huang, W., Roscoe, R. D., Craig, S. D., & Johnson-Glenberg, M. C. (2021). Extending the Cognitive-Affective Theory of Learning with Media in Virtual Reality Learning: A Structural Equation Modeling Approach. *Journal of Educational Computing Research*. <https://doi.org/10.1177/073563312111053630>
- Johnson-Glenberg, M. C., Kosa, M., Balanzat, D., Nieland, R., Apostol, X., Rayan, J. A., Taylor, H., Bartolomea, H., & Kapadia, A. (2021). COVIDCampus Game: Making Safer Choices. Proceedings of the International Conference on Immersive Learning Network 2021 (ILRN).
- DiBenigno, M., Kosa, M., & Johnson-Glenberg, M. C. (2021). Flow Immersive: A Multiuser, Multidimensional, Multiplatform Interactive Covid-19 Data Visualization Tool. *Frontiers in Psychology*, 12. <https://www.frontiersin.org/articles/10.3389/fpsyg.2021.661613/full>
- Ioannou, A. Bhagat, K. K., Johnson-Glenberg, M. C. (2021). Learning Experience Design: Embodiment, Gesture, and Interactivity in XR: Editorial. *Educational Technology & Society*.
- Johnson-Glenberg, M. C., Jehn, M., Cheung, R., Nieland Zavala, R., Apostol, X., Rayan, J., & Bartolomea, H. (2021) Genesis of the Interactive CovidClassroom Simulation. *Frontiers in Communication*. <https://www.frontiersin.org/articles/10.3389/fcomm.2021.657756/full>
- Huang, W., Roscoe, R., Johnson-Glenberg, M. C., & Craig, S. (2020). Motivation, engagement, and performance across multiple virtual reality sessions and levels of immersion. *Journal of Computer Assisted Learning*, 37, 3 745-758. <https://doi.org/10.1111/jcal.12520>
- Johnson-Glenberg, M.C., Su, M., Bartolomeo, H., Ly, V., Nieland Zavala, R., Kalina E. (2020). *Embodied Agentic STEM Education: Effects of 3D VR Compared to 2D PC*. Immersive Learning Research Network. Proceedings of 6th International Conference, iLRN 2020, Online, June 21-25, 2020. Immersive Learning Research Network. ISBN 978-1-7348995-0-4.
- Ioannou, M., Georgiou, Y., Ioannou, A., & Johnson-Glenberg, M. C. (2019). On the understanding of students' learning and perceptions of technology integration in low- and high-embodied group learning. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., and Baker, M. (Eds.). *A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL)*, V. 2. Lyon, France: International Society of the Learning Sciences.
- Johnson-Glenberg, M. C. (2019). The Necessary Nine: Design Principles for Embodied VR and Active STEM Education (pp. 83-112). In P. Diaz, A. Ioannou, K.K. Bhagat, & J.M. Spector (Eds.), *Learning in a Digital World: Perspective on Interactive Technologies for Formal and Informal Education*. Singapore, Springer. https://link.springer.com/chapter/10.1007/978-981-13-8265-9_5
- Johnson-Glenberg, M. C. (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>.

- 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> .
- 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. DOI: 10.4018/IJGCMS.2015100103
- Johnson-Glenberg, M.C., Savio-Ramos, C., & Henry, H. (2014). "Alien Health": A Nutrition Instruction Exergame using the Kinect Sensor. *Games for Health Journal*. 3, 4, 1-12. <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/HCI 2013, Part II*, LNCS 8022. 380–389. Springer-Verlag, Berlin.
- 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. & 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 Keynotes, Blogs, Workshops

Johnson-Glenberg, M. C., Kapadia, A., Liu, F., LiKamWa, R., Yu, S., Bennett, A., Kosa, M., Bao, Y., Balanzat, D., & Yu, C. S. P. (April, 2022). *XR - Titration and Civil Engineering: Design Issues & Preliminary Results*. Interactive poster presented at the American Educational Research Association (AERA), San Diego, CA..
<https://www.aera.net/Publications/i-Presentation-Gallery>

Johnson-Glenberg, M. C. (July, 2022). *Pedagogical Quality in Educational VR*. Keynote for WebXR Education Summit. <https://thepolys.com/event/webxr-education-summit/>

Johnson-Glenberg, M. C. (Dec, 2022) Keynote Presentation. *STEM education in VR: Designing to make students more reflective and metacognitive*. Society of International Chinese in Educational Technology (SICET). Online Keynote for Conference, Dec. 3, 2022.

Johnson-Glenberg, M. C with Chris Dede, Mel Slater, and Jeremy Bailenson (2021, May). The Future of XR. Immersive Learning Research Network (iLRN). Opening Keynote Presentations. Virtual conference (Virbela) .

Johnson-Glenberg, M. C. (2019, Nov.). Keynote. At International Conference on Computers in Education (ICCE). Kenting, Taiwan.

Johnson-Glenberg, M.C. (2019, Aug.). Invited Presenter. Game-Based Assessment. NSF Sponsored workshop. University of Minneapolis, MN.

Johnson-Glenberg, M. C. (2018, Sept.). Keynote. At 6th Congreso Internacional de Videojuegos y Educacion (CIVE). Catholic University, Concepcion, Chile.

Johnson-Glenberg, M. C. (2018, April). Design guidelines for VR with hand controls. CAV²ES consortium at Clemson University. Clemson, SC.

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. Invited presenter. Cambridge, MA.

Johnson-Glenberg, M.C. (December, 2016). Platform effects of viewing various formats including IMAX. Presented at stakeholder's *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 of *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.

Relevant Research Grants

Current:

Combining Smartphone Light Detection and Ranging (LiDAR) with Augmented Reality to Enhance Position-Based Teaching and Learning in STEM

NSF IIS-CSE #2114586 Project Period 10/2021- 9/2024 Role: PI on Subaward to ASU
National Science Foundation Funding Amount \$ 574,000

The team will develop software and new data visualization games using LiDAR and “time-of-flight” depth imaging on newer smart phones. The proposed technological innovation will incorporate position measurements and the placement of augmented reality (AR) visualizations based on users’ movements and environmental data to create embodied physics lessons. We will make the games available for free and assess their efficacy.

Augmented fluidity: Haptic vessels for online education of chemistry and fluid concepts in VR and augmented reality
Role: Co-PI

NSF EHR-ECR #1917912 Project Period 8/2019-7/2022 Funding Amount: \$ 750,000
National Science Foundation

The team will develop and research hands-on laboratory activities in virtual reality (VR) and augmented reality (AR) through software-controlled haptic vessels for realistic perceptions of fluid handling to aid high school and college students in understanding chemistry.

Past Grants:

Amazon Adventure: A Giant Screen Film, Educational Outreach and Research on 2D, 3D & Dome Formats Using a Gaming Assessment Tool

NSF AISL #299946 Project Period 1/2014 – 8/2019 Role: Co-PI
National Science Foundation Funding Amount \$2,999,965
Advancing Informal STEM Learning. Dr. Johnson-Glenberg's team created a natural selection videogame that served as a science knowledge assessment tool for the study. She also released a stand-alone instructional game in both PC and Virtual Reality (VR) formats in the spring of 2019. See <https://www.embodied-games.com/>

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 addressed 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
Created and published on an innovative exer-game for youth at risk. Game instructed in nutrition and healthy food choices 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-Glenberg led the design team and created all assessments on a motion capture technology study using the *KINECT* sensor to instruct middle school students in the STEM topic of 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 Role: PI
11/ 2004 - 2006. Phase II Funding Amount \$ 750,000
Training the Tutors: e-modules. SBIR (Small Business Innovative Research)
Dr. Johnson-Glenberg oversaw 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 (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.
Dr. Johnson-Glenberg founded the company, *The NeuronFarm* to commercialize software designed to teach at-risk middle school readers metacognitive reading strategies. She managed the 10-employee company; aided in writing and editing all instructional and marketing content. She oversaw all financials and analyzed all efficacy statistics, several publications resulted from this grant.

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.

Dr. Johnson recruited participants, designed measures, gathered all data, and created 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 one of the few websites in the U.S. 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 helped to co-found, 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 trained 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* and *Ges-Test* references in the 2017 article <http://rdcu.be/sZw7>.