Journal of Online Learning Research (2015) **1**(1), 9-15

A Call to Action for Research in Digital Learning: Learning Without Limits of Time, Place, Path, Pace...or Evidence

CATHY CAVANAUGH
Worldwide Education, Microsoft, United States
Cathy.Cavanaugh@microsoft.com

CHRISTOPHER SESSUMS
Johns Hopkins University, United States
csessums@gmail.com

WENDY DREXLER
International Society for Technology in Education, United States
wdrexler@iste.org

This essay is a call for rethinking our approach to research in digital learning. It plots a path founded in social trends and advances in education. A brief review of these trends and advances is followed by discussion of what flattened research might look like at scale. Scaling research in digital learning is crucial to advancing understanding as digital learning quickly becomes mainstream (Watson, Pape, Murin, Gemin, & Vashaw, 2014) and as learning environments and pedagogies shift rapidly. Educators and leaders need more current and detailed insights into effective practice as education becomes more personalized (Kennedy, Freidhoff, & DeBruler, 2014).

We are seeing growth in participatory experiences in and beyond schools, indicating a broad shift in engagement from consumption to action.

Table 1
General Trends & Education Manifestation

General Trends	Education Manifestation
Citizen science and maker spaces	Inventing to learn (Martinez & Stager, 2013), maker labs, robotics clubs
DIY movements in media, crafts, cuisine, farming	Culinary, arts, and agriculture programs that integrate technology
Coding, app development	Code camps and academies
Entrepreneurship	Leadership programs, start up boot camps and pitch events
Volunteerism	Service learning, social action
Student-directed learning	Problem and challenged based learning, student construction of personal learning environments (Drexler, 2014)

Educators, too, have embraced opportunities to actively create the content for their students (Ferdig, 2014), take control of their professional learning such as in teach meets, ed camps, and communities of practice (Sessums, 2014), and examine their practice through inquiry or action research (Dawson, 2012). In parallel, learning has become increasingly individually-oriented, socially-pursued, and learner-driven (Cavanaugh, Maor, & McCarthy, in press), accelerated by changes in:

INTERFACES FOR LEARNING

• Powerful ubiquitous mobile devices offer a growing range of interactions including more fluid, natural, and humanistic interfaces like digital ink and voice with translation on the fly (Oviatt, 2013).

• Practiced modeling on the part of the teacher empowers learners to leverage new interfaces for learning.

LEARNING COMMUNITIES

• Mobile devices and easily-created cloud communities offer access to opportunities for apprenticeships, mentoring, and peer learning in global and local collaborations, enabling a return to ways people learn best and most want to learn (Cavanaugh, 2014).

• Networked learning shifts the focus from content to connection. Students connect with experts and peer-learners to build local and global learning communities.

LEARNING DESIGN

- Moving away from mass education reduces the need for predetermined objectives and enables more dynamic, social, rich, personalized facilitated learning without boundaries of time, place, path, and pace.
- Educators can model and facilitate the processes necessary to scaffold personal learning for students. This includes practicing digital responsibility, digital literacy, organizing content, socializing, collaborating, synthesizing, and creating (Drexler, 2014). As such, learners are increasingly empowered to design and construct custom learning experiences.

DATA ON LEARNING

- No longer do analysts and researchers hold keys to data on learning. Anyone can meta-learn, making us all more nimble and skilled on learning through the lifespan.

OPENNESS TO CHANGE

There is a growing interest in trying new technologies, new apps, and new ways of approaching teaching and learning. For example, open textbook creation and adoption along with new models of learner-centered professional learning are growing in size and popularity.

These changes open opportunities and challenge us to propose new principles, platforms, and pedagogies. Ubiquitous technology and data give more tools of research to more people. Now educators have increasing archives of data from students, powerful tools of analysis in their computers and in the cloud, and access to colleagues with skills of inquiry on practice. Thus, educators are empowered (Fetterman, 1994) as never before to be researchers in their schools. As an example, a program that explored scaling up teacher inquiry used an online action research support system that provided distributed mentors who collaborated on the stages of inquiry and that provided data aggregation to enable broad insights on teaching and learning (Dawson, Cavanaugh, & Ritzhaupt, 2012). Scaling research on practice in digital learning will require coordinated approaches like this one that can connect more educators, mentors, and researchers in a massive distributed research community. Flattening our approach to digital learning research is a way to scale our knowledge base and increase student learning.

Flattening digital learning research changes the relationships that trained professional researchers in universities and other organizations have with the educators whose practice is often the subject of their study. In the flat relationship, teachers are the primary researchers whose inquiry is guided, facilitated, and meta-analyzed by researchers. In this relationship, teachers

generate questions, data sources, analysis, and insights with guidance as needed from researchers, served in part by tools of machine learning that are increasingly available to educators. Flattening of the research process further provides opportunities to engage students in design and analysis. In addition, they are better positioned to self-direct and refine the learning approach as adaptive learning models are applied. Machine learning enables schools and researchers to retrospectively understand patterns shown in the data, as well as to gain predictive insights that can guide planning and policy. Machine learning models can account for student factors, teacher factors, learning outcomes and experiences, and school factors. Schools have used machine learning to improve student tutoring for independent learning. Such forms of adaptive learning hold great promise for personalizing learning for students. It is also important to note that such models still require a high level of teacher-student engagement to be affective. Such machine-based models are not meant to remove humans from the learning equation; instead, they serve to enhance the time and energy devoted to creating meaningful learning opportunities for students.

What could flattened digital learning research look like? What are the specific calls to action?

1. Teachers, schools, governments, and education providers seek, develop, and use student learning data tools and systems, including apps and programs, that support learning first and document learning, including appropriate quantitative measures and qualitative demonstrations of learning, such as eportfolios, projects, and collaborative problem solving (Davier & Halpin, 2013).

2. Educators and schools form specific inquiries about learning and seek insights from unanticipated relationships afforded by longitudinal data, ideally collected in machine learning systems. Educators work with researchers to develop data models.

3. In collaboration, educators, leaders, and researchers, apply data models to identify effective practices and conditions for learning and apply insights to practice.

4. Collaborative research teams connect to join datasets for broader insight and disseminate learning to the profession.

5. Taking this a step further, how might the individual learner determine the effectiveness of his or her personal learning strategy? As researchers engage the learner in the research process and provide open access to the related data, students are further empowered to control pace, divert the focus, and accelerate learning based on individual needs.

In parallel, educators should look for opportunities to partner with developers in universities and businesses to create the tools they need to support and document learning, agree on student data protection practices (Ravitch, 2014), and prioritize links between data systems so insights into learning will be informed by a broad dataset (Strategic Data Project, 2013). Such a shift will require a re-visioning of many current school practices. Adopting new ways of thinking and behaving depends on a number of factors that take into consideration such attributes as:

- The relative advantage of these opportunities;
- The compatibility of new practices within the current school context;
- The level of complexity training and trialability entail;
- Whether adopting these new behaviors is optional or mandatory; and
- How these ideas are communicated and promoted.

In addition, there are a number of strategic, social, and economic factors that need to be clearly articulated to support deep, meaningful change.

How can flattened digital learning research be managed and funded? This approach to digital learning research could continue to be funded as education research is currently funded, with portions of the funding supporting school data systems and researcher time for mentoring in schools. To further scale this approach, more researcher capacity will be needed to work with schools. Building researcher capacity can be modeled on the US land grant university agricultural extension service that embeds agents in communities to bridge research and practice through matched federal and state funds. Allocation of public funds to a network of education extension researchers in residence could result in returns to communities in the form of higher levels of school completion and readiness for college, career, and community, correlating with entrepreneurial growth and other economic benefits (McKay, Williams, Atkinson & Levin, 2014). Portions of school professional development and accreditation budgets could support its collaborative research efforts, given that participation in inquiry into practice is a powerful form of professional learning (Dawson, 2012), and the outcomes of these efforts will document school quality.

Another important factor to consider in this process of flattening research are the teachers themselves. Such an innovative shift in practice involves a certain level of uncertainty (Rogers, 2003). Creating the conditions for adopting a flattened digital learning research model involves multiple stages of decision-making for all stakeholders. While school leaders and university researchers can help teachers build knowledge about conducting research, persuading teachers and implementing such practices requires time and careful planning. School leaders interested in adopting these innovative

practices need to take into consideration not only their current operating conditions but also the felt needs of those being impacted by such a change. School leaders need to be prepared to clearly articulate why such changes need to occur. Will the new model simplify existing practice? How easy or difficult will the change be? What problems will such a change solve? If left unaddressed, such questions can potentially result in a low rate of adoption.

We now have in mature education systems and increasingly in emerging education systems all of the tools and talent we need to dramatically increase our effectiveness based on insight from data. With a few bold actions, we can flatten digital learning research to scale up our collective impact, giving educators, and perhaps the students themselves, roles as drivers in education innovation and research. Until we do, we will pay for a growing pool of data and systems in digital learning without the return on the investment that is possible.

References

Cavanaugh, C. (2014, June). *ePLC: Potential and Design of Professional Learning Communities in the Cloud*. Published in the Proceedings of EdMedia: World Conference on Education Media & Technology. Waynesville, NC: Association for the Advancement of Computing in Education (AACE).

Cavanaugh, C, Maor, D., & McCarthy, A., (2014). Mobile learning. In R. Ferdig & K. Kennedy (Eds), *Handbook of Research on K-12 Online and Blended Learning* (pp. 391-441). Pittsburgh, PA: Entertainment Technology Center Press, Carnegie Mellon University.

Davier, A. A., & Halpin, P. F. (December 01, 2013). Collaborative Problem Solving and the Assessment of Cognitive Skills: Psychometric Considerations. *ETS Research Report Series*, 2013, 2.

Dawson, K. (2012). Using action research projects to examine teacher technology integration practices. *Journal of Digital Learning in Teacher Education, 28*(3), 117-124.

Dawson, K., Cavanaugh, C., & Ritzhaupt, A. D. (2012). ARTI: An online tool to support teacher action research for technology integration. In C. Hartshorne, T. Heafner, & T. Petty (Eds.), *Teacher education programs and online learning tools: Innovations in teacher preparation* (pp. 375-391). Hershey, PA: IGI Global.

Drexler, W. (2014) Personal Learning Environments in K-12. In R. Ferdig & K. Kennedy (Eds.), *Handbook of Research on K-12 Online and Blended Learning* (pp. 447-466). Pittsburgh, PA: Entertainment Technology Center Press, Carnegie Mellon University.

Ferdig, R. (2014). *Curriculum, Content, and Assessment for the Real World*. Redmond, WA: Microsoft Corporation.

Fetterman, D. M. (1994). Steps of empowerment evaluation: From California to Cape Town. *Evaluation and Program Planning*, *17*(3), 305–313.

Kennedy, K., Freidhoff, J., & DeBruler, K. (2014). *Personalized Learning for Global Citizens*. Redmond, WA: Microsoft Corporation.

Martinez, S. L., & Stager, G. (2013). *Invent to learn: Making, tinkering, and engineering in the classroom*. Torrance, CA: Constructing Modern Knowledge Press.

McKay, K., Williams, L., Atkinson, A., & Levin, E. (2014). *Enhancing Support for Lower-income Entrepreneurs through Major Public Systems*. Washington, DC: Corporation for Enterprise Development.

Oviatt, S. (2013). *Design of Future Education Interfaces*. New York, NY: Routledge.

Ravitch, D. (2014, October 10). *Tech companies sign pledge to respect student privacy; Critics skeptical*. Diane Ravitch's Blog. http://dianeravitch.net/2014/10/10/tech-companies-sign-pledge-to-respect-student-privacy-critics-skeptical/

Rogers, E. (2003). *Diffusion of Innovations* (5th ed.). New York, NY: Free Press.

Sessums, C. (2014). *Learning Communities and Support*. Redmond, WA: Microsoft Corporation.

Strategic Data Project. (2013). *Toolkit for Effective Data Use*. Cambridge, MA: Center for Education Policy Research.

Watson, J., Pape, L., Murin, A., Gemin, B., & Vashaw, L. (2014). *Keeping Pace with Digital Learning: An Annual review of Policy and Practice*. Evergreen, CO: Evergreen Education Group.