TWG 10: New paradigms for researching digital technologies: achieving scalability and sustainability

Leaders: A/Prof Sarah Howard, Prof Lynne Schrum

Group members: Dr Alex Young, Mr Henk Sligte, Prof Joke Voogt, Prof Georges-Louis Baron, Dr Sandrine Turcotte, Dr Ron Owston, Prof Steve Kennewell and Prof Michael Spector

Group description

Design research, design-based implementation research (DBIR), research-practice partnerships and learning analytics/big data are new paradigms that especially call for the participation of practitioners for co-designing and conducting research projects along with researchers. These developments pose new issues and challenges for research at the local level to large scale national and international research studies. New paradigms need to be developed which help to overcome the limits of more established research approaches and of current meta-analyses. Additionally, new learning environments and borderless learning present further challenges to researching IT in education and require strategies to find ways in which more locally designed based research might co-exist with more distant forms of data gathering and analysis?

DRAFT paper argument and outline

It is essential that schools and educational bodies are empowered to fully engage in new paradigms of technology-related educational research. New paradigms include, but are not limited to: design research, design-based implementation research (DBIR), research-practice partnerships and learning analytics/big data. These are new paradigms that particularly focus on participation of practitioners for co-designing and conducting research projects with researchers. Creating partnerships is a necessary component of creating long-lasting innovation and digital change in teaching and learning. Partnerships foster stakeholder buy-in, engagement and ownership, are more likely to result in meaningful outcomes that address real needs. While sustainability and scalability of partnerships is important, it is also necessary to consider how these ideas may change across different educational contexts in light of technology-related change.

Historically, sustainability and scalability of educational research interventions and innovations has been a goal, but one which research practitioners have often fallen short. As a result, for several decades now (e.g. Blakely, 1987), research has struggled to fully inform and support social innovation, particularly in achieving longevity in initiatives (sustainability) and the capacity to share successful change initiatives between contexts (scalability). As a result, this has contributed to disengagement with change initiatives, lack of trust in research and a growing gap between research and practice. In the field of educational technology, this has been particularly problematic given the significant resource costs, specifically time and economic, of implementing technology programs in schools. To address this issue in light of new research paradigms, we argue that the concepts of 'sustainability' and 'scalability' need to be reconsidered to fully encompass and take advantage of new

approaches and research opportunities for both partnership in research and digital change in educational organizations, teaching and learning.

We propose to use the concepts of sustainability and scalability as starting points and scaffolds to analyze existing case studies of technology-related change and develop a framework for research and change. A key factor missing from the design of change initiatives and research has been systematic consideration of culture and context in relation to sustainability and scalability. Specifically, the long-term needs of teachers and learners, the community and associated value and beliefs related to digital technologies, learning and change need to be integrated into research designs. To do this, is necessary to move beyond ideas of diffusion of and fidelity to innovations, as core concepts of sustainability and scalability, to consider experimentation, flexibility and creating meaningfulness in research and innovations to support long-lasting digital change in teaching and learning.

Initial key components of a Framework:

We aim to draw on ideas of systems, design thinking, design-based research, prototyping and experimentation, to develop a framework to guide research into digital technologies and change in education. These processes bring ideas of iteration, reflection and collaboration to research designs and to build understanding of new research paradigms. Building on what we know about leadership, values and beliefs, and will begin to look at the larger system forces of change to understand what is needed to sustain and move digital change to new contexts. A proposed DRAFT framework is as follows:

- Collaborative - Desired outcomes, research is designed and scoped and 'readiness' assessed with stakeholders
- Alignment - Research informs organizational priorities, aims and culture
- Meaningful - Research and expected results are relevant and important to leaders, teachers, students and the community
- Scale - Research that can be adapted across individual contexts and to a high system level
- Sustainability - Design research processes to be embedded in culture, independent of individuals, on-going and with limited overhead
- System feedback - Design includes early and consistent reporting
- Real-time - Design data loops for specific formative and 'just-in-time' feedback for the innovation and the research

These principles are closely aligned with concepts of 'big data' and big data research (e.g. Kitchin, 2014) and design-based research (Anderson & Shatuck, 2012). The intention is that, while they are listed in an order, that these are not steps or necessarily sequential. Instead, the above draft framework provides a high-level context responsive approach to engaging with new paradigms of educational technology research. The most critical element of this approach is focusing on creating meaningful and durable digital change in educational contexts. The use of data and collaboration among researchers and stakeholders are the two essential parts of this aim. It is the hope that this emphasis will result in a more principled and flexible approach to educational technology research, which responds to cultural differences and a full range of research designs.

Importantly, the draft framework also aligns with the new World Bank Draft Principles for Edtech Readiness Index (Trucano, 2019), which were recently released. A key aspect of this index is the concept of 'readiness', assessing precondition of technology-related change and guidelines for policies supporting change initiatives. This emphasizes the importance of considering change at a systemic level, and for researchers and stakeholders to deal directly with the complexity and dynamism of technology-related change in education together. This includes work in both developing and developed countries, given the constant changing nature of digital technologies. While an organization may be 'ready' for educational technology in one year, does not mean they are always ready.

However, proposed elements of the draft framework can be problematic. The use of data and participatory research have both been problematized. At this time, there are very significant concerns around the power and bias of analytics in learning, automated data collection and use, the development of artificial intelligence, and the level of informed consent and participation of students and teachers in research and analysis (Williamson et al., 2019). There is also a quickly growing interest in the ethics around new digital technologies, participation and data collection. In response to these concerns, new critical research in educational technology as identified several possible 'futures' for technology integration and use (see Macgilchrist et al., 2019). This work provides several views of technology use by students, each of which is problematized. It is necessary to engage with possible futures and take stakeholder concerns about digital practices and tools seriously in change and innovation. Further to this point, Dexter et al.'s (2017) report on the role of research in district decision making regarding digital technologies provides insights into the complexity of this process. These influences on technology decision making, as it affects change, can only be identified through close collaboration with stakeholders.

Research must work within contextual issues and needs, to understand how they can be navigated and addressed in research designs. This design stage of research, the combined input and use of data to inform ongoing work, is a critical link between research and practice (e.g. McKenny & Schunn, 2018). to design effective and meaningful research. As suggested earlier, this problematizes the concepts of 'sustainability' and 'scalability' as traditionally viewed. This is a necessary step in creating a more productive and meaningful relationship between research and practice, across educational systems.

Process

There are three key points in how we develop this agenda. The first is this working paper, which provides the draft framework and critical questions, from which the group will springboard when meeting in person. The second step is working as a group, where the framework and approach to research will be developed. The third is the writing of the paper for the Special Issue and wider other dissemination. This will begin in Quebec and extend beyond the meeting.

We aim to disseminate directly to practitioners and policy leaders, outside of academic publishing. By targeting outlets valued by these groups our work is more likely to have an impact. Ultimately, we propose the broad aim of this group to be focused on empowering schools and educational bodies to engage in research, to support long-lasting digital change.

To begin this work, we are asking TWG10 group members to bring together the best research and case study examples they can access, to begin to understand the heuristics of successful digital change at a cultural and systemic level. A key aspect of this will also be the flexibility of research designs and implementation rather than fidelity, to contribute to a framework embedding innovation, systemic change and cultural relevance in this work.

To start, we provide a few quotes and case studies to consider and prepare for our work in Quebec. We are looking to the following quotes as potential positions for this work:

The art of reinvention will be the most critical skill of this century -- Medium

"Change happens in very localized places; it's highly contextual, and it's inherently human… Much as education policymakers and educators are increasingly attending to what learners want and need, we similarly should seek to appreciate what places (cities, regions, states/provinces) want and need. If we can tap into the interests of specific places, we will tap into their passions to drive change that's 'sticky.'" - G. Behr, CEO, Grable Foundation

For case studies, we would like you to have a look at:

Sara Dexter et al.'s report: The Role of Research in K-12 District Decision Making
Larry Cuban's Blog on School Reform and Classroom Practice
- Have a look at Bread Crumbs and School Reform, also
- World Studies: Technology Integration at Mountain View School (

We are using Cuban's blog for raw data on school change. He has a series of blogs drawing on classroom and school observations, related to technology reform. The World Studies blog is an example. Familiarize yourself with this school and we'll discuss their reform as an example.

The overarching question to put to the group is:

There are a number of new challenges to researching digital technologies in education, such as new learning contexts, educational data and informal learning. These challenges have the potential to dramatically change teaching and learning. How can researchers overcome the limits of existing research approaches with new research paradigms that can address both contextual needs and encompass a broad range of data and analytic approaches, to better understand the new challenges of digital technologies in education?

Specific questions

1. We have put forward possible components of a framework in the text above, but this is only a starting point for considerations in new research paradigms and change. We would like other necessary considerations, alternative perspectives, critical critique and development from group members. Much of this work will be done when we are in Quebec, but we would like to have a start for the initial outline we will prepare for August.
2. What recent literature needs to be considered to address the 'state of the art' of research in this area? What are the 'big studies' and ways of thinking that need to be considered or argued? This will provide a shared basis of understanding,

drawing on our different perspectives, and will become the literature of our draft TWG paper for the special issue.

3. Do you have examples and/or case studies of educational innovation that consider school culture and context? These may be published or not published. These can act as a foundation for developing a research framework. This does not need to be the most successful but should reflect concepts of systems thinking, DBR, experimentation, etc. We are looking for ways to flesh out concepts that may feed into the framework.
4. What are professional publication outlets where our findings could reach practitioners? For example, TechTrends would reach a professional audience. Also, it may be possible to access Education Department publications. in New South Wales we have an Education Department publication called SCAN (see here). Our aim here is to reach practitioners and policy leaders, to directly communicate the framework and/or develop relationships for future change.

References

Anderson, T., & Shattuck, J. (2012). Design-Based Research. *Educational Researcher*, *41*(1), 16–25. https://doi.org/10.3102/0013189X11428813

Dexter, S., Francisco, A., & Luke, C. (2017). *The Role of Research in K-12 District Decision Making*. University of Virginia. Washington, D. C. Retrieved from http://digitalpromise.org/wp-content/uploads/2014/11/Improving_Ed-Tech_Purchasing.pdf

Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big Data & Society*, *1*(1), 1–12. https://doi.org/10.1177/2053951714528481

Könings, K., Seidel, T., & van Merriënboer, J. G. (2014). Participatory design of learning environments: integrating perspectives of students, teachers, and designers. *Instructional Science*, *42*(1), 1–9. https://doi.org/10.1007/s11251-013-9305-2

Macgilchrist, F., Allert, H., & Bruch, A. (2019). Students and society in the 2020s. Three future 'histories' of education and technology. *Learning, Media and Technology*, 1–14. https://doi.org/10.1080/17439884.2019.1656235

McKenney, S., & Schunn, C. D. (2018). How can educational research support practice at scale? Attending to educational designer needs. *British Educational Research Journal*, *44*(6), 1084–1100. https://doi.org/10.1002/berj.3480

Trucano, M. (2019). Some draft principles to inform the creation of a new global edtech readiness index. *World Bank Blogs: EdTech*. Retrieved August 28, 2019, from https://blogs.worldbank.org/edutech/some-draft-principles-inform-creation-new-global-edtech-readiness-index?CID=WBW_AL_BlogNotification_EN_EXT

Williamson, B., Potter, J., & Eynon, R. (2019). New research problems and agendas in learning, media and technology: the editors' wishlist. *Learning, Media and Technology*, *44*(2), 87–91. https://doi.org/10.1080/17439884.2019.1614953