The Use of iPads to Enhance/Transform Student Learning

Prepared for Barnstable Public School District

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The latest iteration of technology into education in the classroom is the iPad. Considering that the iPad is a relatively new product, it is hard to assess the benefits it brings to student learning. Here I will briefly summarize what is known and what is not known, and consider how the use of iPads might be evaluated.

The Promise of iPads

IPads were first introduced in 2010. Their expansion into the education market is impressive, but now other "Post-PC Tablets" are offering competition. The adoption of the technology is faced with two questions: 1) are the benefits of iPads or other Post-PC Tablets worth the cost to a district, and 2) how can the tablets be best used to enable enhanced/transformed student learning to increase student achievement?

As tablets have only been around for four years, and really within schools and districts for two to three years, the answers to the questions offered above are incomplete. Much of the research that has been done is what might be called "perception research." This is distinguished from "opinion research" in that it is based on what students and/or teachers perceive to be the case, and is the result of observation and experience, rather than simple opinion research which is primarily what we think is the case or more speculatively will be the case. Opinion research is often influenced most by preconceived notions about the topic of tablet use. Opinion research dominated the field first, and it was about what iPads could or should do; now it is perception research and it is how students, teachers, and sometimes parents evaluate what they are doing and seeing.

Neither perception research nor opinion research offers "hard data"[1] on student outcomes, and hard data is particularly difficult to find among research reports. Another complication is that much of research that is reported is done by technology-associated groups. Those articles tend to be heavier on the positive reports.[2] Overall, it is much easier to find research that shows positive outcomes than any that finds challenges or problems associated with technology- enabled learning. Does this mean

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[1] Hard data is often defined as information that is quantified. But any data can be quantified into one of four kinds of scales of measurement—nominal, ordinal, interval or ratio. Opinion or perception research turned into numbers is still based on opinion or perception. If measurement is not done well with any kind of information, it doesn't inform.

[2] An example is a Google site sponsored by SecuredgeNetworks. They reported on eight studies of research in classrooms that "showed that iPads in classroom improve student education." They did not report of any studies that found a lack of improvement or where associated challenges also were found.

that iPads are benefiting student learning? In many ways perhaps they are. Certainly there is a "perception" that is the case.

One of the more complete literature reviews was carried out by Darsenti and Fievez in Quebec, Canada. They concluded at the end of 2013:

> *Let us recall that the literature review revealed very little evidence or empirical data on this issue. Nevertheless, it allowed identifying some of the assumed benefits of the touchpad for education, which remain to be demonstrated. . .*[3]

Darsenti and Fievez then went on to set up a research program to "gain a deeper understanding of the uses, benefits, and challenges of using the iPad in school." They did this in partnership with 18 schools[4] across Quebec, Canada. In phase one of their work, they combined interviews, focus groups, and in-class observations[5] to determine benefits and challenges involved in daily use of iPads. **Benefits** were many and included increased student motivation, greater access to information, ease of making notes and organizing work, quality of students' and teachers' presentations, greater collaboration, more creativity, use of a variety of resources, students can work at their own pace, development of students' and teachers' IT skills, and improved learning experience. **Challenges** included touchpads being a distraction, problems in writing lengthy texts, didn't make learning to write any easier, some of the textbooks didn't work well with the touchpads, not enough teacher planning to enable the transition, difficulties organizing student work, teachers needing more information about resources available on iPad, e-books were under-used, and in some cases the touchpads were enough of a distraction that academic performance suffered. This research is summarized more fully here because it was based on a large number of students and teachers and its findings are similar to other perception-based research. They did also show graphs illustrating grade improvement in some cases, but they were so minor and for such a short period, that no trends could be established. They recommend:

> *More systematic studies on the impact of enriched technological environments on students' academic performance as well as longitudinal studies to track the academic and professional paths of students who attended iPad classrooms in order to determine impact of this innovative experiment.*

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[3] Thiery Karsenti and Aurelien Fievez, (December 1913) *The iPad in education: uses, benefits, and challenges—a survey of 6,057 student s and 302 teachers in Quebec, Canada. Montreal, QC: CRIFPE." Preliminary Report of key Findings, p. 7*

[4] They included both elementary and high schools in their research. The discussion of findings did not separate out the two groups.

[5] Observations by outsiders using a rubric increases the objectivity of perception research, but too often it focuses on time on iPad tasks rather than evaluating the learning benefits.

Hopefully that is being done in the second stage of their research.

Another thorough review of literature was done by Wilma Clark and Rosemary Luckin with the London Knowledge Lab.[6] They summarize their review as follows:

> *When it comes to Teaching and Learning students are generally reported to be positive about the iPads, seeing them as essential for 21st Century education. Within this report there are examples of iPads being used to support learners beyond simple drill and practice games, to support collaborative learning, to provide personalized learning experiences, iPads to augment and enhance deep learning, as ubiquitous, distributed and connected learning tools.*

They add that students are more engaged in their own learning by being more motivated, enthusiastic and independent. They do warn, however, that this is not a " 'one-off' decision as the on-going costs, and the need for on-going evaluation and monitoring should not be underestimated."[7]

When the evaluation research moves beyond the tablet environment to the use of technology more generally, the picture is not much clearer. In a review of 300+ articles describing the use of video games and academic achievement, little support was found that the games had any impact on academic learning.[8] Other research have found similar results—there is little gain in academic achievement when technology is introduced into classroom settings without carefully integrating technology and pedagogy. Michael Fullan, Professor Emeritus at the Ontario Institute for Studies in Education, University of Toronto, takes the planning a couple of steps further. He argues that the criteria for integrating technology and pedagogy needs to be "1) Irresistibly engaging, 2) elegantly efficient, 3) technologically ubiquitous, and 4) steeped in real-life problem solving."[9] How far we are from that was found by research carried out by the Nellie Mae Education Foundation. They found only eight percent of teachers fully integrate technology into their classrooms, and only 23 percent feel they could do so, 43 percent of students feel unprepared to use technology effectively as they look ahead, and that organizational support for good

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[6] Wilma Clark and Rosemary Luckin, (2012) "What the research says: iPads in the Classroom. London Knowledge Lab. Institute for Education. University of London, p. 2

[7] Wilma Clark and Rosemary Luckin, p. 4

[8] Michael F. Young, Stephen Slota, Andrew B. Cutter, Gerard Jalette, Greg Mullin, Benedict Lai, Zeus Simeoni, Matthew Tran and Mariya Yukhymenko (2012), "Our Princess Is in Another Castle: A Review of Trends in Serious Gaming for Education, Review of Educational Research, Vol. 82, No. 1 (March), pp. 61-89.

[9] Michael Fallan (2013), *Stratosphere,* Pearson, p. 33.

use of technology is underdeveloped.[10] This research was published in 2011, so it is likely that there has been some progress since then.

Race to the Top and *Common Core* both encourage transforming teaching and learning to prepare students for success. Post-PC Tablets is seen as one of the ways of doing that by integrating technology into academic learning rather than treating it as a skill in its own right. Technology has been integrated into teaching and learning since the invention of the printing press and the books that resulted. The idea of technology in schools was initiated in schools via the audio visual world that dominated education during the first three quarters of the 20th Century. It took some time for computers and computer technology to have an impact, and its promises were there long before its reality. But now, just as within other institutions (look at the political and economic), its rapid change and influence is difficult to anticipate, manage and evaluate. Lengthy "gold-standard" methodologies of evaluation do not fit the rapidly changing digital environment very well. Fallum does conclude:

> . . . overall we find little evidence of the impact of technology on learning (at least not yet, which is my point). In one sense this finding is obvious. We used to call this "on the risk of appraising non-events." If the innovation has not been implemented, it can hardly have much impact.[11]

Massachusetts Department of Education has developed its own technology standards. For many, the digital world is here and the educational institution is seen to need to be a part of it, or it will cease to be relevant. Another way to think about iPads and other post-PC tablets and whatever other technological tools are being used or will come next is that they have so invaded all the institutions of society, that students must learn to use them in ways embedded in content (disciplines) and skills, to be able to succeed as they move forward through educational and career steps.

How to Proceed

How, then, are decision-makers able to decide what level of commitment a district should make to "Post-PC Tablets," the most recent iteration of the digitized world in which we live.[12] One step is to seriously consider what it is thought the presence of iPads will do. One thing that all of the research agrees upon is that schools and districts have to be very clear on what is expected from the use of iPads and to offer the training necessary for classroom teachers to be able to work toward those learning outcomes. The other would be to establish clear learning outcomes that can be meaningfully measured. In the literature, associated with the encouragement of the use of technology that is integrated with pedagogy, is an adoption of a broader set

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[10] Babette Moeller and Tim Reitzes (2011), "Integrating Technology with Student-Centered Learning, Quincy, MA: Nellie Mae Education Foundation.

[11] Michael Fullan, *Stratosphere (2013). Pearson. P. 39.*

[12] It is worth noting that the two major pieces of research on the use of iPads came from England and Canada. Globalization is with us.

of learning strategies. Frequently quoted is Hattie's research in which he did a meta-analysis of 800 studies world-wide. He found that reciprocal teaching, feedback, teaching student self-verbalization, and meta-cognition strategies were important instructional techniques.[13] These approaches to student achievement blend well with the use of Post-PC Tablets.

Because the iPads are already in place in 7th grade, the best approach would be to identify what learning the iPads should be good at enabling that classrooms without them cannot do nearly as well.[14] Enhancement and transformation of learning approaches are two expectations that are found in the literature. The International Society for Technology in Education (ISTE) lists four standards to that end: 1) creativity and innovation, 2) communication and collaboration, 3) research and information fluency, and 4) critical thinking, problem solving and decision making. Two other commonly mentioned desired outcomes of introducing touchpads are greater use of individual learning models and more efficient and process-based feedback and assessment. These learning approaches are already found in classrooms, so the question that needs to be answered is whether or not iPads and other technology improves student achievement beyond what is already In place.

More "perception research" is probably not needed. Perception research has fairly clearly established that though there are challenges, the perception is that the advantages outweigh the challenges.[15] The evaluation needs to become more specific and targeted to particular perceived problems in learning and their digital solutions. Back to the idea of enhancement and transformation. How are iPads going to enhance? How are they going to transform? What would teachers expect to see if that happened? It might be useful to work with an example here. One often mentioned advantage of iPads (or other Post-PC tablets) is that it enhances collaboration. (It might also transform collaboration, but that is for the teacher/student and student/student interaction to determine.) Collaboration has certainly occurred in classrooms prior to the introduction of the iPads. But there is the suggestion that collaboration skills would be improved by introducing iPads into the mix. The teacher needs to develop a model of how collaboration is to be enhanced/transformed because iPads are used, and then develop a rubric for measuring whether or not it worked.

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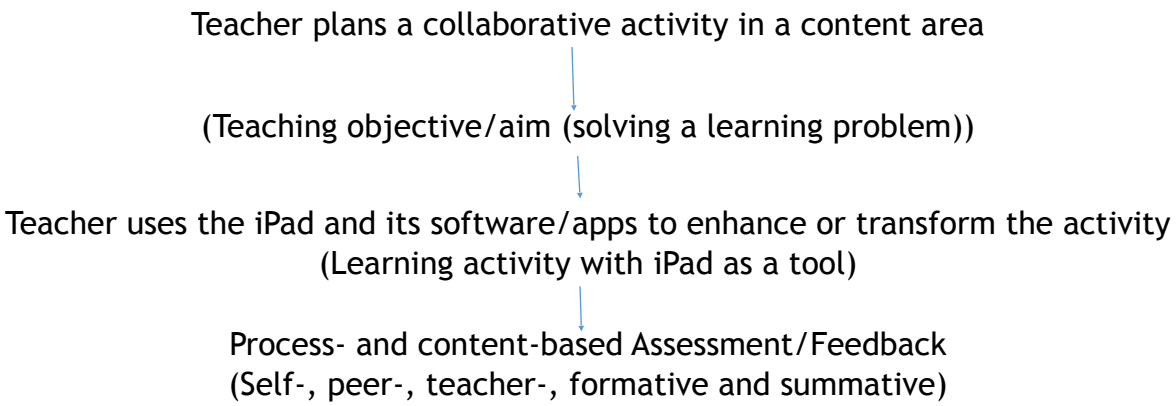
[13] John Hattie (2009), *Visible Learning: A Synthesis of over 800 Meta-analyses Related to Achievement*. London: Routledge. P. 243. Hattie is accused of an over-simplistic approach to doing meta-analysis, hence his measurement of effect sizes may not be valid.

[14] Frederick M. Hess and Broi Saxberg (Spring, 2014) refer to this as encouraging educators to start thinking like learning engineers. "These educators ask what problems need to be solved for students, turn to research to identify solutions, and devise smarter, better ways to promote terrific teaching and learning. What is education technology's role in all of this? Learning engineers see technology as a tool, not a solution." "Schooling Rebooted." *Education Next*, vol. 14, no. 2.

[15] In fact, if perception research in a particular classroom, school, or district showed that there were not positive results that would suggest a problem with how the Post-PC Tablets were being used rather than the introduction of their use itself. That would, of course, be an important finding.

Collaboration, in and of itself, is probably good, educationally speaking, but some collaborative efforts are more successful than others. Collaboration is both a process and produces an outcome. Both need to be evaluated. Is the collaboration enhanced and did students better understand the concept/process being explored, whether it is In science, math, or another discipline. The following diagram illustrates[16]:

[16] This model is based on work by Isa Jahnke and Swapna Kumar (Apr. 2014), "Digital Didactical Designs: Teachers' Integration of iPads for Learning-Centered Processes." Journal of Digital Learning in Teacher Education, 30:3, 81-88, DOI 10.1080/21532974.2014.891876



The fortunate part of the above model is that the same assessments that are done as a part of the learning activity can also serve as the evaluation instrument. It would be expected that the number of instances of these would increase over time as teachers and students become more competent and as teachers share their successes. The use of iPads in and of themselves is not the goal, so time on iPads is not an effective measure, it is iPads embedded in learning activities that needs evaluation.

After teachers and students have built an iPad-infused learning environment, other outcome measures would be available to evaluate benefits. Does attendance improve over previous years (an indication of engagement in learning)? Do the teachers in follow-up grades detect differences (do the benefits last)? Do test scores in relevant topics of standardized tests improve (are the benefits measurable on standardized tests)? Do principals see effective use of technology in the classroom when they do their evaluations are effective pedagogical techniques observed)?