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Our Agenda for Technology Integration: It's Time to Choose

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I sometimes ask graduate students—as an informal measure of their baseline knowledge at the beginning of a semester—what "technology integration" means to them. Here's a sample response written by a teacher enrolled in the first week of her first educational technology course:

> A classroom that has successfully integrated technology into the curriculum would be one where you would not really notice it because it would be so second nature. The teacher would not have to think up ways to use whatever tools were available, but would seamlessly use them to enhance the learning of whatever content was being covered. Technology [would be] used to assist in acquiring content knowledge, and the acquisition of technology skills [would be] secondary.

Contrast this depiction with what the International Society for Technology in Education's (ISTE) National Educational Technology Standards for Students (NETS-S; ISTE, 2002) say about technology integration:

> Curriculum integration with the use of technology involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting....Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions—as accessible as all other classroom tools.

Though both explanations acknowledge a necessary link with curriculum, the latter depiction emphasizes how students would use tools to obtain information, while the former emphasizes how students' content learning would be assisted with tool use. The distinction is more than semantic, and its import may well point to one of two primary reasons why many—if not most—large-scale technology integration efforts are perceived to have failed: technocentrism and pedagogical dogmatism. In this editorial, I offer thoughts about each of these phenomena and invite you to respond.

Reason 1: Technocentrism

Nearly two decades ago, Seymour Papert (1987) would have described this excerpted NETS definition as "technocentric," which, he asserted, is "not very different" from "an information-centered approach to education." Papert explained his term by saying,

> I coined the word technocentrism from Piaget's use of the word egocentrism. This does not imply that children are selfish, but simply means that when a child thinks, all questions are referred to the self, to the ego. Technocentrism is the fallacy of referring all questions to the technology.

Instead of seeking educational u ses for particular technologies, Papert urged, educators must focus upon how to best assist students' learning. Though he would repudiate a curriculum-centered, rather than a learner-centered approach, his urging to shift the focus from the learning tools to what is being learned and how that learning happens still needs to be heeded—almost 20 years later. As Earle (2002) asserted,

> Integrating technology is not about technology – it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices in better ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used, but by how and why it is used. (p. 7)

Technocentric approaches to educational technology research and development have produced a fragmented and largely unusable literature base, leading to recent and empassioned calls for substantive changes to the educational technology research agenda (e.g., Bull, Knezek, Roblyer, Schrum, & Thompson, 2005). Zhao, Pugh, Sheldon, and Byers (2002) explained the disconnect by saying,

> Traditionally, studies on educational technology have been largely interested in finding out, in horserace fashion, the relative success of particular technological innovations as it affects student learning....Because many of these technology-specific studies did not explore more fundamental issues in technology and education...the research community is having a difficult time offering desperately needed suggestions to policy makers and practitioners. (p. 483)

Perhaps what needs to be further developed, examined, and shared are particular curriculum standards-based instructional strategies that are appropriately matched to students' learning needs and preferences. In doing so, they would demonstrate pedagogically appropriate uses of educational technologies.

Promising examples of research studies examining the effectiveness of particular technology-enhanced instructional strategies do exist, though their numbers are disappointingly small at present. (See, for example, the Center for Applied Research in Educational Technology's "student learning" summary focusing upon student learning at http://caret.iste.org/index.cfm?fuseaction=evidence&answerID=1#references%22.) Using this approach to educational technology inquiry, our focus can shift from technologies' supposed "effects" to understanding the processes and interim results of how and why specific tools can and should be appropriated in particular ways to help students with distinct needs and preferences to achieve identified learning goals.

Still, as misguided as purely technocentric approaches to technology integration are, they are not nearly as pervasive and distracting to educators, developers, and researchers as a particular strain of pedagogical dogmatism long embraced and largely unrecognized by many in the international educational technology community. It's time to reconsider this set of pedagogical assumptions, then decide whether we move forward with or without them.

Reason 2: Pedagogical Dogmatism

Look again, if you would, at the two depictions of "technology integration" that introduced this editorial. Note that the first, written by a teacher, emphasizes the teacher's roles in technology integration. The second—an excerpt of a product of much effort by the broader educational technology community—emphasizes the student's roles in technology integration. This is no coincidence, and the two depictions are probably—and surprisingly—pedagogically incommensurate.

Since Papert's publication of *Mindstorms* in 1980, leaders in the educational technology community have advocated student-centered, authentic (often problem-based) applications of educational technologies that emphasize the development and application of higher order thinking skills and practices. In these scenarios, both teachers' and students' roles change dramatically from the status quo. Moreover, "successful" technology integration is seen in this view to be only that which reflects this reformed vision of education.

Consider, for example, Moersch's (1995) widely used LoTi (Levels of Technology Implementation) tool. The six-level "framework for measuring classroom technology use" is designed to assist school districts "in restructuring their staff's curricula to include concept/process-based instruction, authentic uses of technology, and qualitative assessment." LoTi clearly reflects an evaluative preference for learner-centered, rather than teacher-centered, instructional activities. As Moersch and colleagues explained,

> As a teacher progresses from one level to the next, a series of changes to the instructional curriculum is observed. The instructional focus shifts from being teacher-centered to being learner-centered....Traditional verbal activities are gradually replaced by authentic hands-on inquiry related to a problem, issue, or theme.

The apex of the six identified levels—non-use, awareness, exploration, infusion, mechanical integration, routine integration, expansion, and refinement—is one in which "technology is perceived as a process, product...and tool toward students solving authentic problems related to an identified 'real-world' problem or issue." School districts using the LoTi framework would, arguably, value the same types of technology integration and would seek to change teachers' instructional practices to match those described at LoTi's higher levels.

Consider, also, another widely used educational technology integration assessment tool, the STaR Chart (School Technology and Readiness Chart), which is available in both K-12 and teacher preparation versions. It is described by its developers as "a self-assessment tool designed to provide schools with the information they need to better integrate technology into their educational process" (CEO Forum on Education and Technology, 2001) Six of the questions on the 20-item K-12 StaR Chart address technology integration directly. These items favor—with higher self-assessment item scores—"student-centered" over "teacher-centered," or even "teacher-directed" or "teacher-facilitated" approaches, and technology as an agent of educational reform, as demonstrated by the possible responses listed under Item 14 ("Students employ digital content to enhance learning"):

- Reinforce basic academic skills
- Use for research, communications and presentations
- Use for research, to solve problems, to analyze data, to collaborate, to correspond with experts and to become content producers

- Digital content changes the learning process, allowing for greater levels of collaboration, inquiry, analysis, and creativity. (p. 7)

Scores for each predominant use of educational technology described in this item increase as the list progresses. According to the national StaR Chart, then, technology use in what is typically described as "constructivist" learning is preferable to technology used to "reinforce basic academic skills." Spivey (1997, p. 3) stated that constructivism is both a metaphor and a theory; both a theoretical metaphor and a "metatheory," characterized by the "generative, organizational, and selective nature of human perception":

> Constructivists view people as constructive agents and view the phenomenon of interest (meaning or knowledge) as built instead of passively "received" by people whose ways of knowing, seeing, understanding, and valuing influence what is known, seen, understood, and valued.

Though many educational technology leaders may prefer to teach and learn in constructivist ways, it is time to question whether professional, political, or personal penchants should dictate large-scale educational policy – especially in democratic societies that value ideological diversity.

As these two assessment tool examples demonstrate, current understanding of the nature and accomplishment of curriculum-based integration of educational technologies – defined in *Education and Technology: An Encyclopedia* (Kovalchick & Dawson, 2004) as "the effective integration of technology throughout the curriculum to help students meet the standards and outcomes of each lesson, unit, or activity" (Gunter & Baumbach, 2004, p. 193)— is also framed as educational reform. Even the *Encyclopedia*'s definition of "curriculum integration" specifies that in order to accomplish it,

> ...the role of the teacher must change to become that of a facilitator. The teacher's role changes from being the "sage on the stage" to being the "guide on the side." As teachers plan authentic learning experiences that incorporate a variety of tools and technologies, they need to be prepared to guide students through the learning experience. This requires a good foundation in computer literacy, information literacy, and integration literacy. Initially, teachers may be uncomfortable with the role of facilitator; however, as students adjust and learn to be more responsible for their learning, they will be more motivated and become better problem-solvers. (Gunter & Baumbach, 2004, p. 194)

As discerning educators and researchers, we should question why teachers' roles "must" change to integrate technology effectively into K-12 curricula. Surely the technologies themselves do not require this shift, as current teacher-centered classroom uses demonstrate.

The educational technology rhetoric of the past two decades demonstrates a basic confusion between technology integration – the pervasive and productive use of educational technologies for purposes of learning and teaching—and technology as a vehicle of educational reform (e.g., Means, 1994). In operational terms, one notion does not necessarily imply or require the other, and it is time for us to choose which of these two emphases will be our primary agenda.

Choosing an Agenda

Unfortunately, despite more than two decades of effort, technology as "Trojan horse" for educational reform has succeeded in only a minority of K-12 contexts. In a 20-year retrospective on U.S. educational technology policy, Culp, Honey, and Mandinach (2003) expressed the mismatch between educational technology leaders' visions and how most practitioners use digital tools in the following way:

> Technological innovations favored by the research community, intended to support inquiry, collaboration, or re-configured relationships among students and teachers continue to be used by only a tiny percentage of America's teachers....Instead, teachers are turning to tools like presentation software, resources like student-friendly information sources on the Internet, and management tools like school-wide data systems to support and improve upon their existing practices... (p. 22).

McCormick and Scrimshaw (2001) characterized such uses for information and communication technologies as "efficiency aids" and "extension devices," clearly differentiating them from "transformative devices" (p. 31), which "transform the nature of a subject at the most fundamental level" (p. 47). Interestingly, these authors suggested that such curricular transformation happens only in those few content areas (e.g., music, literacy, and art) that are "largely defined by the media they use" (p. 47).

The U.S. National Educational Technology Plan (U.S. Department of Education, 2005) described the mismatch between educational technology leaders' visions and educators' practices in simpler and more evaluative terms: "Yet, we have not realized the promise of technology in education....Computers, instead of transforming education, were often shunted to a 'computer room,' where they were little used and poorly maintained."

Does the "promise" of technology integration necessarily require bottom-line educational transformation? Dexter, Anderson, and Becker (1999) said that there is "a strong need to revise the image of computer as catalyst of instructional change" (p. 237). Though teachers in the nationally representative sample they studied acknowledged that computers helped them to change instructional practice over time, they cited experience, organized professional learning, and school culture as the primary factors provoking instructional changes. Educational technology use, it turns out, is no Trojan horse, despite the wishes and hopes of many of its advocates.

In addition, and perhaps more importantly, there are ethical difficulties with assuming that educational technology use "should" favor student-centered, constructivist modes of learning and teaching. In districts in which teachers' academic freedom is preserved—at least in part—aren't the pedagogical approaches to be used the result of decisions that each teacher makes, preferably rooted in a well-informed knowledge base of both students' learning needs and preferences and corresponding methodological alternatives? Can it really be assumed that a particular approach "works best" in all teaching, learning, school, district, and community contexts?

If the goals of technology integration are separated from the goals of educational reform, teacher educators are faced with an important choice. Should we, as educational technology leaders, concentrate our efforts upon developing, testing, and disseminating a wide range of educational technology uses that support a broad spectrum of pedagogical approaches? Or should we recommit—and state publicly—our intention to help schools

change the nature of teaching and learning through particular applications of digital technologies?

Considering that the latter choice has been the largely unstated (and, arguably, unsuccessful) agenda for the past 20 years of educational technology work, perhaps a new approach is warranted at this point in time—one that genuinely respects pedagogical plurality and honors teachers' academic freedom. In choosing differently, we would also commit our efforts in a different direction: to broaden our research and development work to encompass many different digitally supported instructional strategies while trusting our colleagues to consider and choose appropriately among all of them.

The choice suggested here is not an easy one to make, since many educational technology leaders—this author included—may have entered the field with not-so-hidden educational reform agendas of our own. Still, I urge us to consider seriously whether it is more appropriate to try to change the nature of teaching and learning through the integration of educational technologies—or to help teachers and learners use appropriate curriculum-based technological applications more pervasively in all of their varied forms.

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