Late in 2000, the technology magazine *Converge* asked for an article that "would be in possibilities-style - that is to say, written from the viewpoint of 2015 as if you were living in 2015 and observing the past, and connecting the present and future from the vantage point of 2015."
This is what followed….

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Learning Our Way to the Future

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It came as a shock -- it wasn't supposed to be this way. This wasn't the future any of us had predicted back in 2000. Yet it seemed completely natural.

This was our conclusion, here in 2010, as several of us gathered to toast the end of a major "educational technology" association. With so few technology "specialists" in schools now, it was no longer needed. Back then, when we mostly spent our time creating visions of technological sugar plums to dance in the heads of educators, we hadn't quite foreseen the transparent, ubiquitous roles of technology in schools that existed now in 2010. Like the telephone, copier, fax machine and computer in non-school organizations of the 90's, "technology" had somehow been absorbed into just the way schools did their business.

In fact had we wanted to, we probably couldn't have figured out how to get to this integrated state so quickly and totally. In ten years, technology had become part of the infrastructure of daily school life, much as utilities had been in our homes. Technology was now clearly providing "answers" to "questions" we weren't even asking back then.Oh sure, we talked about the digital revolution, providing children with greater access to knowledge, lifelong learning opportunities for everyone, etc. We knew all about what the *technology* could do, but really didn't look deeply enough at what it might enable *people* -- other than students -- to do. And we were satisfied with small, random acts of innovative technology use because we couldn't imagine *anything* changing in education this comprehensively and rapidly.

What we hadn't foreseen was how schools would benefit from use of the last century's most effective tool of change -- the *lawsuit* -- as a way to make people face what they *should* have been doing all along. It had seemed to work with other "industries" such as tobacco, guns, and *Microsoft*, but we just couldn't imagine what would happen when a small group of parents decided to sue their schools.

How it all began...

It may be hard to remember now but back in 2000 we just accepted without questioning a lot of things that didn't make sense. We seldom looked beyond *the ways things are* in schools to note the paradox that these conditions existed *only* in schools. Especially in the case of technology, the rest of society seemed to operate with different rules for their tools.

•   We didn't notice that the public expected technology to be applied differently in schools as opposed to other work organizations. For example, we didn't ask why the availability of technology in schools had been largely dependent upon gifts, grants, and volunteer help -- and not part of the bottom-line operating infrastructure. Why would this be accepted for schools and not, for instance, for hospitals?

•   We were so happy whenever technology's potentials were recognized in a national reform or restructuring report or initiative, that we didn't notice that it usually was portrayed as a necessary, but costly, <u>end</u> in itself -- one of several needed changes to be brought into schools that would first require an overall restructuring of that environment to make it "fit." Seldom did these reformers see it as a value-enhancing strategic <u>means</u> to enable critical changes in that same environment.

• We didn't ask why, in other organizations, the tools fundamental to the *core, or primary, work* of the organization were part of *every* site involved in that work. In education, this seemed to apply more to administrative offices than classrooms.

• We didn't ask why teachers would be the *only* professionals in modern society to not welcome and demand tools that can provide them with "the power to be their best." Teachers have as much, or more, education than peers in other public and private sector institutions; they are driven by commitments to children that help them endure conditions that would not be tolerated by other professionals; and many of them are technologically-literate outside the school workplace. Why wouldn't teachers actively seek out technology as a way to increase their impact on the children whose lives they touch?

• And, happy that schools and technology were finally at the top of policymakers agendas we, with hindsight now, can see how we missed a major shift in the political climate about schools that was influencing it. Many times caught up in it ourselves, we didn't notice how the nature and pace of pressure on schools to "do something" had changed.

Society, after years of promised *reform* and *restructuring,* began to realize that even the right people with the right stuff still didn't seem to be enough. The best minds being applied to education reform still hadn't figured out how to develop and sustain their

approaches in *real time* school systems for *all* children. Regardless of the quantity or quality of resources provided, their ideas hadn't "scaled up" or "down." Promises and visions of "tomorrow's" schools were losing their power to satisfy those who cared most about "today's."

The "future" gap

An ever-widening gap had grown between visions of tomorrow and actions for today that began to fill with *frustration,* and if one had a child, *fear.* As a result, a fundamental shift in the sources of "pressure" for change began to occur. Educators had grown accustomed to pressures from what at first they considered "school-bashers" -- those advocates of breaking up the system through *home-based schooling, vouchers, charter schools, for-profit* schools. To some, they seemed selfish and not caring whether or not America's unique system for providing equal educational opportunity for *"all"* children survived.

But then something began to change. People who did care about opportunities for *all* children began to join those advocates for breaking up, if not eliminating completely, the *school system.* These included teachers unions, minorities, "liberal" organizations, respected politicians, and progressive business leaders.

Not clear then was a common factor behind these increasing demands for seemingly-simple, quick changes. These parents, teachers, or employers directly interacted with specific children growing up at that time. *Their* opportunities for making a difference in those children's lives were *now* -- not tomorrow, after the educational "system" changes.

And these people -- who had their hands on tomorrow, today -- felt even more helpless. They knew they couldn't "let go," at least not for long. They saw that attempts by others to "fix" the system seldom reached their kids. Is it any wonder that they desperately sought to do "anything" -- including destroying the system -- that seemed as if it might make sense and allow their children to have positive learning experiences "now."

Change it *all* ..and do it *now.*"

Support for more immediate, total change also began to come from CEO's in both the private sector, state and local government. Like other's at the time they often had a seemingly simple diagnosis for what was wrong with schools and a similar prescription for what should be done about it. Often these involved technology. But something was different when they called for "systemic change."

The particular consistency in the "answers" called for by these corporate and political CEOs seemed to come from their unique experiential perspective -- as *system* leaders they were accountable for the *individual actions* and *total results* of a complete, connected work system. They knew from experience that system thinking and planning was not enough. Effective results required an organization able to <u>act</u> *as a system*. These system leaders, each in his or her own way, was saying:

"Change it <u>all</u> [i.e., the whole school system and its parts], do it <u>all at the same</u> <u>time</u>...and do it <u>now</u>."

This made sense to them because they could understand how to do this in their own work systems in business or government. There, they knew the nature and requirements of their organization's work. But they lacked a mental map of how "everything connects to everything else" in schooling. They could "see" education's "parts," but couldn't make sense of how they interconnected to form the system that was producing -- or wasn't -- the results they were seeing.

Because of this fuzzy map, the seemingly-logical, piecemeal changes they had supported also contributed to the frustration of the time… and its common outlet -- blame. Soon it began to appear that there might be only one truly *systemic* process that met all three of their criteria for changing an entire system quickly -- <u>destroy it</u>. Break apart and eliminate "the system," or go somewhere and start your own. It did not matter to them (nor should have it necessarily) that the positive changes they wanted to create would meet needs of only *some* children, and probably wouldn't be sustained for others after the new approach's original champions left.

So that was the world of 2000 swirling around schools when the frustration in one community finally peaked and some folks decided that the way to bring some sense to this complexity was to "sue somebody." Someone was failing to apply proven knowledge to the needs of *their* children in their schools.

<u>Malpractice</u>
Here in 2010 it may seem hard to believe that back in the 90's the world seemingly "discovered" the human *brain*. As scanning technologies revealed how it actually *learned,* the popular media suddenly began to deal with this new body of knowledge emerging from brain research as an important issue. In the short space of one year it became a cover story concern for <u>Newsweek,</u> <u>Time </u>and <u>US News & World Report.</u> In his State-of-the-Union address, the President announced that he was *"going to convene a*

White House conference on early learning and the brain to explore how parents and educators can best use these <u>startling</u> new findings." ABC presented a major prime time special on the subject. And the National Governor's Association held hearings about this new form of observable research. Two weeks later one Governor told his legislature and a statewide TV audience about how it affected him:

> *Some of you have heard me talk about little children's brains for 4 years now. You maybe getting tired of it. <u>But now I've got science on my side.</u> My wife up there in the gallery has known it for a long time…and she just wants to know why it's taken me 40 years, 4 children, and 6 grandchildren to figure it out?"*

In one community, awareness of this "new knowledge" about how a child's mind "works" as it develops its potentials, began to make a lot of sense to a small group of parents who began to relate it to their own experiences as learners in schools and in life after schooling. What didn't make sense to them was that they saw so little attention paid to it in their children's schools. This was, after all, *basic* knowledge and yet it seemed to challenge many of their school's own practices.

When they begin to question teachers or their principals about why they were not taking advantage of a child's natural mental "programming," or actually were going *against* it, they heard a variety of responses. The learning principles made sense to teachers and administrators, too. Many of them were validated by their own experiences when they had "had the time" to work with individual children. In fact, a lot of the "reforms" they had been trying to make in schools for over thirty years had usually focused on <u>one</u> of those principles. But of course those individual reforms never lasted. But there seemed to be an underlying theme -- We know we "*should,*" but we *"can't."* Too many other things would also have to be changed, including what the public expected schools to *be* and *do*.

The local school system seemed "incapable" of action. In their frustration the parents began to look for who to "blame," … and for who might be able to "fix" it. But they couldn't seem to find that one person or place in the system that could create specific changes that would impact <u>their</u> children.

Their frustration mounted every time they heard policymakers, researchers, technologists and others promise that everything would be fixed *someday* after changes outside the schools happened. Changes in teacher training, policies or policymakers, funding for technology, and even promises to wipe out the whole system of public education and start over so it could be done "right."

While some of the critics seemed to make sense, the parents continually came back to *their* criterion for changes -- they had to impact <u>their</u> children, <u>now</u>, and in <u>their</u> schools. From the popularized cognitive research they had learned that some windows of learning opportunity or development seemingly just come by once-- (there were optimum times for certain skills or capacities)-- and they begin to see that there can be consequences for <u>not acting</u> on this "new knowledge." They didn't want those consequences for their children.

Finally, out of frustration, a parent tried to pull together what they had learned.

"Why are we spending so much of our time on this?… Because its our children. But we're taxpayers, why should we have to figure this out? *They* are supposed to be doing that. How can we make them?"

"Our children have specific learning needs and styles that are not being responded to appropriately. Would any of us send our children to a hospital that didn't treat them in terms of their *individual* characteristics and needs. No! Would we send them to a hospital that didn't use what modern science has already proved has a better chance of working. No! If the type of knowledge we have about the fundamental workings of *all* children's' brains related to any other body organ, it would drive related medical practice. Practitioners would be compelled to use it, not just because of the obviously better results, but the consequences or risks of <u>not</u> using it would be more obvious. If this available knowledge weren't used, a hospital's customers could sue it for malpractice.

   "Hey, Let's sue them for malpractice!"

<u>The trial</u>

This isn't the place to re-live that trial, but the transcript makes interesting reading for anyone studying the history of educational change. Nevertheless, the trial's widespread effects came from the nature of the learnings that emerged from it, who used them, and the fact that it was carried live on *Court TV* . Reflecting on it now in terms of the technology we *see* and *don't see* in these schools, here were some of its key points:

•   The plaintiff parents called expert witnesses who presented irrefutable evidence about how learning takes place, and how this requires different or earlier interventions. They built a sound case not just by calling on cognitive scientists, but also people in the community who were asked to recall their own or their children's school learning experiences. *What gave them "ah-ha's?" When were they "turned on," and when*

"turned off?" These memories of personal learning experiences from school, business or family lives seemed to provide additional "data" to judge the validity of the "scientific" knowledge.

- The school's defense included…

"We only did what was <u>expected</u>…";

"The general ways we run schools had worked for <u>them</u>" The "them" were the present generation of adults outside and inside schools whose own education years before led them to believe similar processes could be effective. Under questioning, however, they admitted that this effectiveness was "only for *some*."

"Where was the proof that not applying this knowledge caused "harm?" How can you prove," they asked. "that harm can be a projection of a potential not achieved?" Here the plaintiff's lawyers presented the same data that had led the President and some governors to take that new body of research seriously; recognize its applicability to *all* children, not just some; and more significantly, that had made them aware of the consequences of ignoring "use-it-or-lose-it" windows of opportunity for learning.

That data had revealed the *social costs* of missing those opportunities. The consequences for an individual's behavior for the rest of his/her life were obvious, but now they could see actual data about how this played out in what society had to pay for down the line. As one of the community's leaders noted: "If we were talking about a rash that doctors had discovered on all two-year olds, there would be a public outcry. This <u>is</u> a public health issue!"

"And anyway, even if research is valid, the real problem doesn't start on our watch. Solutions would have to start sooner. And those who set the rules for the game would have to have the same set of beliefs.

When school witnesses tried to make the point that education is a "state" function, the plaintiffs called on a representative of the state education department who hurried to note that the state couldn't be held accountable for the ways local schools operated. The state's "job" was to set standards, and provide ways to test students to see whether they met them.

Under cross-examination, he was asked what happens if these test scores showed that schools didn't improve? His response "We will take them over." "What then would the state do differently after a "takeover" that the school's weren't already doing?" he was asked "...and if you actually know, why aren't you helping the schools do that <u>now?</u>"

• As the trial went on, it was clear that it's audience inside and outside the courtroom was being pulled back and forth by the arguments of each side. New "facts" about what happens *inside* children made sense, as did many of the older "facts" about what happens outside them in the organization people's own experiences had led them to assume schools were *supposed to*, or *could*, be.

Sympathy grew for both "sides." Children and their families living in the complexities of today's society on the one hand; and on the other, caring practitioners -- teachers and administrators -- who were obviously trying as hard as they could everyday, -- but who seemed to be swimming upstream against a current they couldn't identify except as "the system."

<u>A missing link</u>
• It seems now that the trial might have ended that way in a "hung" community, if a group of teachers and administrators had not begun to think they saw a missing link between the two sides. And it had to do with "technology."

It came about because a teacher -- a former employee in high tech industry caught in the wave of late 90's layoffs decided to return to her earlier dream. She become a teacher in order to make a difference for children instead of widgets. After returning to school and getting her degree and certification, she finally had a chance to jump into the flow of real school life. Because of her work experience in non-school settings, obvious differences with the school worksetting soon began to become obvious.

First she noticed that when she had been hired in industry, no one assumed she already knew enough to be just plugged into a job and left on her own. It had been assumed that her most important learnings would come from actually *doing* the work. The work setting was set up so that she could have needed feedback and support to learn from and improve her work each day.

She also noticed that before, when she encountered a problem, she was able to turn to others to get help. Now as a teacher, she had no immediate access to any assistance. Helpful training or resources, if provided, came long after the immediate need existed.

• After sharing these concerns with a small group of teachers and administrators, and looking more closely at the *differences* between these two worlds of work, they began to notice the roles technology played in each. In one it was ubiquitous, a "given" that added value to the work of just about *everyone* in the organization. In the other that did not seem to be a priority. If resources were limited [as they always were,] it had always seemed to make sense that applications for children must come first. If it had to be *either-or*, children would be the priority. Why was it seen as *either-or* in schools, and not hospitals, for instance?

• With these new insights, the defense called two new witnesses. One, a well-respected local doctor, the other, a prominent leader of industry known for his calls for "systemic" change in education, and his gifts of technology to schools and classrooms.In both cases the lawyers questioning focused on their *assumptions* -- first those on which they organized and conducted their own organization's work, and then on those they held about organizing and conducting the *work* of schools. It was clear they didn't match. But why?

• An interesting answer began do emerge from the examination and cross-examination. At first glance the "work" of hospitals, widget-developing corporations, and even supermarkets seem totally different. But their work processes shared one characteristic that seemed so logical that it was buried as an assumption of *just-the-way it-is*. In each case, at the base of the visible work process was a fundamental sequence of events -- a *core work process* -- that was determined by the <u>unique fundamental nature of the final *result*</u> -- the "product" of *all* the work that must be done. And technology's most *value-adding* use was to support the quality of that core work.

It seems obvious that the final shape and nature of a car determines the flow and structure of its construction. Similarly, in a hospital, the universally-accepted, fundamental common nature of the human body determines the core structure of the hospital's work process -- *diagnosis and prescription*. Universal acceptance of everyone's "sameness"-- in the ways they are internally organized and function -- actually enables the work of medical practitioners to focus on and respond to the "differences." This fundamental self-correcting process of <u>interactive diagnosis and prescription</u> [e.g., "Take two aspirin and call me in the morning"] grounds *all* medical practice. This *informed interaction* has become such a transparent "given" in the equation that it is just assumed. One wouldn't go to a hospital that treated everyone the same.

As the witnesses struggled for answers to why they didn't assume that schools as worksettings had the exact same requirements when they attempted to respond to the requirements of their "product" -- the unique mind of each child...the judge called for a recess.

Time out

• Calling both sides into his chambers, along with the Mayor and leaders of the business community, he suggested that they all might want to look at the evidence presented so far. Was it possible that the answers they were seeking about the "results" of their schools, and why they didn't receive the same type of support as all of society's other work settings, might lie in the earlier testimony about their "product" -- *learning* -- and what they all had assumed schools were supposed to do to support it?All agreed to a one-month recess after which they would come back with a decision as to whether or not to continue the litigation.

• During the following days, reviewing the transcripts, they began to recognize the total implications of the brain research. Understanding of *learning* -- the seldom questioned reason why classrooms, schools, and school systems had been structured the ways they were -- had turned around 180°. No longer was it accepted just as accumulated *content*. Learning now could be understood and dealt with as a biological *capacity* inborn in every child. The continual development of this learning capacity was schooling's "purpose." It was the centerpoint that had to define the work relationships of the system that supports it.

• But that wasn't how the "system" seemed to work now. Were they back at "square one?" How could it *all* begin to change in time to help their children? It was at this point that they began to see that the same brain research about *learning* as an "end," also had contributed a related understanding about "*means*." Children weren't the only "learners." The same principles applied to the minds of those around the child who needed to learn continually *from* their work if they were to act differently in meeting children's individual needs.

They began to see that the single concept emerging from brain research and neuro-science about how the human brain develops and continues to increase its capacity throughout life is that the result called "learning" is the product of *interaction*. While this was not new information to those in the room close to teaching -- effective teaching had

always been a process based upon managing interactions appropriate to the needs of *each* child -- it provided a key knowledge bridge for linking what have been thought of as "management tools" in other worksettings to the organizational reform of schools. Many of the *same* conditions teachers and administrators encounter everyday exist in these other organizations, yet effective integration of technologies in their work hasn't been hindered. In fact, their acceptance as *the-way-work-gets-done* had made them relatively transparent -- buried in the invisible assumptions underlying everyday actions.

Interaction speaks louder than words

The immediate relevance of this "new" understanding for schools began to excite them as they realized that practical knowledge for acting on this was all around them in other "accepted" institutions. Probing deeper, they noticed that, in any field of human endeavor, it was *informed interaction* between the "worker" and the object of the work that engaged the human mind's natural trial and error way of solving problems and achieving purposes. At the "end" of that process, the "quality of results" -- the match between intentions and outcomes, between needs and results -- was directly dependent upon the <u>frequency</u> of that interaction and the knowledge that <u>informed</u> it so it remained <u>appropriate</u> to those needs.

"In industry, the CEO pointed out, "we call that critical, quality-producing interaction the *moment-of-truth*."   It's frustrating sometimes to acknowledge it, he admitted, but the choices made by the last person in the "line" fulfills or diminishes all those decisions from "above" that went before.

When a physician noted that this type of informed "diagnostic/prescriptive" interaction was the core work that <u>defines</u> one as a "professional" -- whether nurse, doctor, or lawyer -- the school's superintendent observed that "we've always known this to be the essence of good teaching, too. Maybe that's why, when it's not supported, a teacher <u>can't</u> be a professional."

This began to make sense. In those other professions, it seemed as if the *organization* was held accountable for outcomes of the core process, not just an individual. To fulfill that organizational accountability, work was structured to sustain the *informed interaction* supporting those moments-of-truth. The organization's flow of information informs that interaction, and time and tools were provided to support the process's *interactivity*.

In these other organizations, <u>results</u> become a *shared responsibility*. Individuals are held *accountable* for creating, managing and sustaining the <u>processes</u> for achieving them. Maybe this was the place to start -- at this core connection between student and teacher -- and begin to see how this view might help uncover how to change practices from the inside-out.

Back to the future

…and that's where it all began. Today as we look around us in these schools and their community what we *don't see* is just as important as what we do.

The most important picture, here in 2010, is of children and adults engaged with each other in productive, and frequently different, ways. Technology is most visible as a support for the "work" each uniquely manages -- *learning* for the student, *teaching* for the teacher. And it seems as if they have the time and *tools* that enable them to learn from, and continually improve, their own work.

What we don't see at first is the technology-supported connecting infrastructure that makes this possible for *all* of the districts "workers" -- both children and adults.

We can't see how they got here so quickly, but know that it was driven by the community's belief that they must respond to today's needs in ways that would simultaneously develop their capacities to respond even better to tomorrow's. They committed to learning about technology, and other new practices, from using them to solve real problems… and by connecting the learners.

Taking advantage of the technologies and process extant at the time in business and industry, people were connected at the points in their work where they sought answers to the same questions -- and in ways that enabled them to discover the answers together.

This offered ways for leaders to capture and capitalize on what each interest brought to that "discovery" process -- the differing views of the conditions that constrain them all, and their practical experiences responding to them. And more important to compressing the time frame, it offered opportunities to collaboratively develop answers that made sense across the range of interests that must be committed for their success if they are to be sustained.

What if…?

"I wonder," one of us mused, "if we had a time machine and could go back to 2000, what learnings we might take with us that could have made us more effective in our work "trying" to bring technology into schools?"

Reflecting on what we had seen, and what we knew about how they got here, we saw three:

• It seemed as if we had much of the knowledge back then, but not a framework that could make it usable. Here, in 2010, it seemed as if everyone had a common map that accurately portrays the "territory" they navigate each day in their attempts to make a difference for children. On this mental map they can see their shared responsibilities for the organization's results, and leaders use it as a plot board for identifying the *interactive connectedness* of their individual accountabilities.

• Most different from the 90's is that everyone understands that the sustainable *system* within which all the critical interactions necessary for learning and teaching to take place is the *school district* and its community. This wider frame around the work of teaching and learning offers a view of schooling as a more coherent whole, and makes it possible to create the connections necessary for systemically sustaining effective practices for all of the community's children.

• Recognizing now that the ways we use technology has more to do with the ways we *think about* technology, we might have noticed the lack of effective dialogue in society among those whose *questions* were concerned about basic educational issues, and those of us with what we believed to be technology-supported *answers* to them. We had our separate associations, journals, and meetings. We even advocated "Technology Strategic Plans" that frequently had little relationship to a district's overall strategic plan.

With that perspective, we might have looked outside education for those -- possibly in business or government -- who had the foresight to help us create ways to connect people to think together about the connections between the questions and answers of the time.

We might even have used technology…