Design as an Inadequate Lens for Understanding Seymour Papert

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ABSTRACT

The recent death of Seymour Papert is an occasion for grief, celebration, and planning for building upon his enormous contributions to knowledge. This paper is a plea for the IDC community to help preserve and expand upon the enormity of Papert's powerful ideas.

Author Keywords

Seymour Papert, design thinking, constructionism, instructionism, school reform, learning.

ACM Classification Keywords

K.3 COMPUTERS AND EDUCATION

INTRODUCTION

The recent passing of Seymour Papert in July 2016 is an invitation for scholars and practitioners alike to reflect upon the man and his work. Such an occasion is not only essential as a basis for future research agendas, but has critical implications for generations of teachers, parents, and children. This paper seeks to guide the IDC community to use its affection for Papert in more expansive ways.

WHERE'S THE ELEPHANT?

Anyone with even a cursory familiarity with Seymour Papert or his work knows of his fondness for parables. The "pencil lab," "surgeon and teacher transported from the 19th Century to today via time machine," "stagecoach with a jet engine attached," "computer as mud pie," and "land where the entire diet consisted of suet," are some of Papert's most popular ways of inviting an audience to embrace what he called "mega-change" in education. [1-7]

One of Papert's favorite parables was of "the blind men and the elephant." [8] The use of this tale was intended to help others not "miss the forest for the trees" (to mix metaphors in a fashion that would have delighted Dr. Papert). While I

applaud the Interaction Design and Children Conference for honoring Papert with its 2017 conference theme, I humbly suggest that interaction and design is the wrong lens through which the life and powerful ideas of Seymour Papert. This stance fails to appreciate the multitude of themes and interconnections that comprised the enormity of Papert's contributions to knowledge by highlighting a tiny "piece of the elephant." Such loving criticism of a friendly institution is consistent with Papert's occasional willingness to "bite the hand that feeds him."

Why nitpick?

A reader of this paper might ask, "why is the author" being so finicky about the use of the terms, "interaction" and "design." Several reasons come to mind.

1. The locus of interaction is within the technology, not the learner/user.
2. Design has come to have very strong corporate and procedural meanings.
3. A focus on interaction or design lends itself to instructionism or technocentrism, while Papert's focus and greatest contributions were constructionist in nature. [9-18]
4. Papert's work was only minimally concerned with design or interaction.
5. Papert's powerful ideas deserve to be shared as widely as possible. The insular nature of any particular community may lead to a misguided impression that the entire world either agrees with them or even shares common knowledge.

PAPERT THE DESIGNER?

Seymour Papert did indeed work with a team including Cynthia Solomon, Wally Feurzig, and others on the invention of the first programming language intended for children and learning, Logo, fifty years ago.

Papert's earliest Logo (research) memos and the seminal paper written with Cynthia Solomon, "Twenty Things to Do with a Computer," [19-22] not only laid out plans for the next several decades of Logo development, but described what children were already doing with computers and Logo in research settings. While it took up to forty years for the challenges outlined in those documents to become possible or even commonplace in schools and the

home, the proof of concept was already well into middle age.

Nearly twenty years later, in 1986, Papert's next significant Logo "design" came to market as *LogoWriter*, a version of Logo with multiple turtles and word processing functionality. Two years later, robotics was added to that programming environment in the form of *LEGO TC Logo*. In 1993, Papert's software company, Logo Computer Systems, Inc., released MicroWorlds, a multimedia version of Logo, complete with unlimited turtles, parallelism, a modern graphical user interface, and ability to share projects on the World Wide Web. While Papert's colleagues, students, and disciples have created new dialects of Logo over the years, notably Scratch, Snap!, and Star Logo. Papert's work as a designer was limited to three or four software environments over more than forty years.

"I am sometimes introduced as "the father of Logo." The aspect of parenthood of which I am really proud is not conceiving the idea in the first place, but staying with Logo and participating supportively in its development — as a father should."[8]

Anyone begging the question by suggesting that Papert "designed" research projects, curriculum, or learning environments mischaracterizes the light hand with which he approached such matters. His life's work was concerned with granting maximum agency and flexibility to learners in what Mitra calls minimally invasive education. [23]

THE RISE OF DESIGN
Whether related to the mission of IDC or not, "design" and "design thinking" have become hot topics, particularly in education. These terms have been defined in the press, literature, and popular imagination.

Depending on the model, design and design thinking have mechanized the design process to a linear progression of four to seven or eight steps, with iteration involved in the testing of a design. Such design is based on identifying a problem and making a product that satisfies a customer or solves the specified problem.

"Framing is the only way to create the right solution." [24]

"Ladenheim described design thinking as "a tangible scaffolding through which [one] can approach problem solving." She specified "reframing" the problem as a central tenant of the process…" [25]

"Design thinking describes a repeatable process employing unique and creative techniques which yield guaranteed results — usually results that exceed initial expectations." [26]

Papert's work barely concerned itself with identifying a specific problem or pleasing customers. The software and game design research of his protégé's used the creation of software for a younger player to use as a conceit that was much more about what the learner learned through software

construction than what a player might be taught about a topic such as fractions by "using" that software. [13, 27-31] Such projects were viewed by Papert as a Trojan horse in terms of school reform; as a way to demonstrate the intellectual capabilities of children programming computers. They had little to do with producing software developers.[32-34]

The rise in popularity of design and design thinking, like so many K-12 school interventions, owes a great deal to the political impulse to equate corporate motives or processes with education.

"Developed by David Kelley, the founder of IDEO –a global design firm and a leader in this space– design thinking is defined as "a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."" [35]

Articles such as the one quoted immediately above breathlessly report how design thinking may be applied successfully to any endeavor while that is simply not the case. The paradigm offers little to disciplines such as history, the arts, or even a great deal of science. In the hands of curriculum publishers, design is too often reduced to making a travel brochure or menu for international food day, while design thinking becomes the recitation of steps absent actual design.

In fact, although learning certainly results from any conscious activity, Papert's work was less sequential, dogmatic, or focused on the needs of others. In Papert's worldview, students engaged with materials, ideas, and others to construct knowledge based on personal experience intimately related to the individuality of the learner.

"Piaget's epistemological thesis is a somewhat different version of the idea that the way to solve a problem is to split the difficulties, to subdivide the problem. An old heuristic idea: if you want to do something complex, take the parts separately. This is an aspect of Piaget's thinking that hasn't penetrated in its full impact - and can be restated as a microworld thesis in this sense. But the child isn't creating microworlds in order to solve a problem. It's not subdividing a problem, it's subdividing the world. So it's a somewhat different view of the same kind of principle, that some- thing in the child's innate capacity allows this subdivision of the world into microworlds, that these microworlds are elaborated and then put together. The process of putting them together is probably easier to understand than the making of them in the first place."[5]

Papert's "Eight Big Ideas Behind the Constructionist Learning Laboratory" [36] (found in Gary Stager's doctoral thesis) offers yet another precise human-centered contrast

to the more utilitarian views of many design thinking methodologies.

Academic interest in design and design thinking may be the result of how "app design" has become synonymous with financial success, an emphasis on demonstrable results, "calls for accountability," and education faculty's increasing interest in anything other than teaching, learning, or schooling.

The growing popularity of the maker movement [1, 37-40] is often used to justify a "design mindset" [41-43] while Papert recognized that making often results from a relationship with materials, personal motivation, and individual style. [11, 16, 18, 36, 44-47]

Typical notions of design embedded in our culture are focused on products and outputs while Papert's work was concerned with projects as incubators of knowledge and learning as a highly individualized process whose primary "customer" is the learner herself.

DESIGN AS TREATMENT MODEL
Papert his mentor Jean Piaget shared a belief that "knowledge is a consequence of experience" [48] and that "it is not the role of the teacher to correct the child from the outside, but rather to create the conditions by which a child corrects herself from the inside." [49]

Education material designers are inclined towards a treatment model of education based on doing something external to the learner in an attempt to facilitate learning. When hardware and software are involved, technocentrism often accompanies such efforts. Power is attributed to the technology, regardless of the learner.

Papert extends Piaget's learning theory of constructivism with his own theory of constructionism.

"Constructivism is the idea that knowledge is something you build in your head. Constructionism reminds us that the best way to do that is to build something tangible -- something outside your head -- that is also personally meaningful." [50]

Learning is results from the actions of the learner. It is internal and intrinsically motivated.

This stance is in direct opposition to that of an instructionist who believes that learning is the direct result of having been taught or contact with something created by others. Elements of personal style, stance, and epistemological pluralism are also critical in Papert's view of learning. [18, 51-53]

Even the notion of microworlds, [54-57] celebrated by Papert for decades, is too often misconstrued as an experience or environment designed for a learner rather than the ways in which learners engage in sense-making through a natural, personal, or perhaps even playful, relationship with transitional objects.

"This aspect of microworlds is an essential one: that you can explore one when you're five - and then again when you're six or fifteen, or continually at all ages, doing more complex operations and projects as you go along, yet with a single, continuous entity." [5]

A DEBT TO THE FUTURE
The IDC Conference organizers are to be lauded for honoring Seymour Papert with their 2017 Conference theme. However, the complete Papert "elephant" includes social justice, artificial intelligence, reinventing mathematics education, cybernetics, school reform, computer programming for children, project-based learning, constructionism, learning theory, epistemology, and much more. His vision for "learning learning" and student agency are important and timely in an increasingly divisive society and oppressive system of schooling.

The need to celebrate and amplify the enormity of Seymour Papert's contributions is especially critical since his work has been erased from K-12 literature and teacher preparation. Teachers need to recognize that they stand on the shoulders of giants and understand that Papert predicted much of what is happening in education, created tools to amplify human potential, and offered profound guidance for creating what Sarason called, "productive contexts for learning." [58-62] Simply stated, the enormity of Seymour Papert's contributions cannot be contained within the parameters of interaction and design.

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