

## **Papert, Parables, and the Future of Constructionism**

### **A Constructionist Call for Action**

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#### **Abstract**

Constructionism approaches middle age at a time of political upheaval, battles over schooling, the emergence of accessible artificial intelligence tools, a rudderless edtech community, a maker movement in hibernation, official demands for computer science for all instruction, the teacher retention crisis, post-pandemic realignment, mobile computing ubiquity, and countless other forces generating chaos and noise. The constructionism community has much to offer in leading education and by extension, society, into an uncertain future, if it chooses to do so. This paper uses Seymour Papert as an object-to-think with to plot the future of constructionism and nurture the long-term health of the constructionist community.

*Keywords and Phrases: Seymour Papert, constructionism, evangelism, impact, teachers, school reform*

#### **1. Introduction**

Seymour Papert, the father of constructionism, was fond of helping others comprehend complex issues or unforeseen opportunities through the sharing of parables. One of his favorites was the tale of the blind men and the elephant. In that story, multiple blind men each touch a different part of an elephant and perceive very different objects. An elephant is different than the sum of its textural parts. Complex systems, such as education, are composed of many disparate elements, focusing on just one is unlikely to affect the whole.

Although this paper's approach may not conform to traditional academic strictures, I am inspired by Seymour Papert's example. This is not an effort to sanctify Papert, but the "constructionist community" is like the blind men confronting an elephant. Each member operates from a specific set of preconceptions, vocational contexts, and objectives. If constructionism is to be sustained, spread, and embraced by a wider universe of practitioners, it behooves us to look at the elephant, rather than its constituent parts. Papert was a big fan of connections, some planned and others serendipitous. Like constructionism itself, this paper challenges convention.

At this precarious moment in history, navigating Papert's mission of making the world a better place for learning requires a blueprint. I propose using Seymour Papert himself as a parable for thinking about thinking about the future of constructionism. In



this quasi-Hermeneutic fashion, understanding Papert is a means for understanding the unfinished business left for his descendants. It is neither misplaced hagiography nor hyperbole to center the “father of constructionism” in its future.

The artificial constraints of an academic conference paper prohibit the sufficient argumentation required to convince a skeptical reviewer, especially one who might view this work through what Papert might call, “research lab-colored spectacles.” The theory of constructionism itself requires an intellectual stance that meaning is constructed by the learner. In that spirit, this paper uses the metaphor of Seymour Papert himself, in all its multitudes, as a transitional object which readers may use to think about thinking, teaching, and learning.

For purposes of organizational consistency, this paper uses a series of adjectives one might apply to Seymour Papert’s oeuvre as buoys in the constructionist ecosystem. Each “part of the elephant,” in no particular order, suggests challenges, issues, and opportunities worthy of subsequent reflection, dialogue, and action.

## **2. The Papert Parable**

### **2.1 Theoretical**

Papert’s contributions to knowledge including constructionism, literacy vs. literacy, instructionism, and personal computing, in addition to concepts he frequently mentioned, such as mathetics, playful learning, or computational fluency, require additional study. There was a fractal-like quality to Papert’s intellectual output. At every level of magnification, regardless of the context or audience, and across decades, one could find remarkable consistency in his ideas. His last three books tell essentially the same story for three different audiences (Papert, 1980, 1993a, 1996), academics, educators, and parents.

### **2.2 Eclectic**

It would be a mistake to focus constructionist research or implementation too narrowly on say geometry, game design, or robotics. Anyone who knew Papert, or was familiar with his work, will tell you that he frequently traveled beyond the boundaries of Mathland (Papert, 1980). He was a man who tinkered with gears, toys, tools, words, theories, and ideas in a seemingly infinite number of combinations.

### **2.3 Compelling**

The seeds of change are in the story, not in the data. Seymour Papert was a great storyteller who believed that collecting and sharing learning stories was critical not only for purposes of evangelism, but for “learning learning.” *The Children’s Machine* (Papert, 1993a) features “An Anthology of Learning Stories” and Papert wished for the book to have been titled, “A Word for Learning.” He demonstrated repeatedly, in print and presentations, how one might move hearts and minds through clear and compelling storytelling.

### **2.4 Prolific**

Seymour Papert’s intellectual output will be pored over for generations, not just for its discoveries, but for the questions left for readers to ponder. Despite his academic pedigree, Papert possessed a great desire to make powerful accessible to the laity. He had a gift for saying a great deal in just a few words. In “8 Big Ideas Behind the Constructionist Learning Laboratory” (Stager, 2006; Martinez & Stager, 2018),

Papert defines constructionism in a one-page manifesto that is as good as anything ever written. From the 1980s until his death, Papert authored few academic papers, and those he did were often subversive or contained thinly veiled contempt for the anachronistic format. He chose to write books, magazine articles, and a newspaper column to disseminate his ideas and engage readers. This work captured a singular voice. His books were published at a reasonable price and intended for a mass audience, not a dozen colleagues.

### **2.5 Engaged**

In addition to writing in a clear and compelling fashion in accessible publications, Seymour Papert made videos for educators, appeared on *Donahue*, spoke at education conferences, testified before Congress, made himself available for interviews, and long harbored a desire to produce a television series about learning. When useful, academia was used as a tool, but otherwise it could be stifling. Papert spent as much time as possible away from his lofty academic perch to tend to his garden of ideas. Is there any doubt he would have embraced social media?

### **2.6 Rooted**

Seymour Papert recognized that he stood on the shoulders of giants and often credited Piaget, Dewey, Montessori, Alan Kay, Marvin Minsky, Eleanor Duckworth, David Hawkins (Hawkins, 1965; Papert & Franz, 1987), and others, including contemporary progressive educators as sources of inspiration.

### **2.7 Connected**

Seymour Papert was keenly aware of the leading lights in progressive education around the world. He was familiar with their work, even if he was not in complete agreement, and maintained personal relationships with many of the educators who were engaged in efforts like our own, with or without computers, to make schools more productive contexts for learning.

This is another reason why Papert spoke at K-12 education conferences and educational technology events where the audience could so immediately be affected by his inspiration. He learned a lot from these interactions as well. The constructionist community cannot build a wall around itself and hope for its ideas to spread.

Papert was a fan of exploiting the multiple meanings of words. In this spirit, connected should also refer to the connections between ideas and blur the artificial boundaries between subject areas. Students engaged in constructionist projects make connections physically and cognitively with great frequency.

### **2.8 Outspoken**

Although at times he could be terminally nice, Seymour Papert never shied away from a righteous argument. His interviews and recorded debates are full of wit and wisdom but can also cause a reader to squeal or wince like they witnessed a boxer land a devastating blow (“Class Wars,” 1997). Papert was at his best when he had a bee in his bonnet like on the occasion that he testified before the United States Congress (CSPAN, 1995).

It would be so good to have Papert around to add clarity, rationality, and humanity to today's half-baked discussions about artificial intelligence in education. I am confident that he would offer a third position with ideas about rich possibilities (Papert, 1993b).

Only a person of Papert's stature could possibly wrestle the well-intentioned, yet poorly conceived approaches to universal computer science education away from cynical robber barons like Code.org who are engaged in denaturing powerful ideas. Rather than amplify the work of constructionist educators with years of expertise, these organizations are coopting the language of computing to produce an illusion of progress through denatured experiences and a low regard for teachers.

## 2.9 Prescient

No mere dreamer, Seymour Papert and his colleagues, invented much of the world they hoped to inhabit. Look no farther than the *Twenty Things to Do with a Computer* paper he co-authored in 1971 with Cynthia Solomon (Papert & Solomon, 1971; Stager, 2021). In that paper, they describe 1:1 computing, children programming, robotics construction kits, and the maker movement decades before the public embraced such ideas.

The current mania surrounding artificial intelligence could be tempered by an understanding of how Logo and constructionism emerged from the MIT AI Lab of the 1970s. Wise constructionists, Papert included, offered a vision of artificial intelligence that serves as a prosthetic for expanding human potential and enhancing our creativity. Papert dedicated an entire chapter *Mindstorms* to AI, back in 1980 (Papert, 1980). The constructionism community could play a valuable role in amplifying a similar vision of AI.

“The definition of artificial intelligence can be narrow or broad. In the narrow sense, AI is concerned with extending the capacity of machines to perform functions that would be considered intelligent if performed by people. Its goal is to construct machines and, in doing so, it can be thought of as a branch of advanced engineering. But in order to construct such machines, it is usually necessary to reflect not only on the nature of machines but on the nature of the intelligent functions to be performed. For example, to make a machine that can be instructed in natural language, it is necessary to probe deeply into the nature of language. In order to make a machine capable of learning, we have to probe deeply into the nature of learning. And from this kind of research comes the broader definition of artificial intelligence: that of a cognitive science. In this sense, AI shares its domain with the older disciplines such as linguistics and psychology. But what is distinctive in AI is that its methodology and style of theorizing draw heavily on theories of computation.

In this chapter we shall use this style of theorizing in several ways: first, to reinterpret Piaget; second, to develop the theories of learning and understanding that inform our design of educational situations; and third, in a somewhat more unusual way. The aim of AI is to give concrete form to ideas about thinking that previously might have seemed abstract, even metaphysical. It is this concretizing quality that has made ideas from AI so attractive to many contemporary psychologists. We propose to teach AI to children so that they, too, can think more concretely about mental processes. While psychologists use ideas from AI to build formal, scientific theories about mental processes,

children use the same ideas in a more informal and personal way to think about themselves. And obviously I believe this to be a good thing in that the ability to articulate the processes of thinking enables us to improve them.”

Recently discovered videos of Papert lectures and conversations include a 2005 discussion of how children could computationally model the effects of climate change following the devastation of Hurricane Katrina. One can easily imagine how Papert’s body of work might be used to address contemporary challenges, including student absenteeism, cellphone bans, the availability of AI, and the increasing dominance of instructionism. Papert’s invention of the future and illumination of what could be emerged from a profound morality, sense of the possible, and focus on the centrality of the learner.

### **2.10 Romantic**

Papert’s work had a poetic quality to it. He often used love as a motivating principle and rejected coercion in any form.

“The goal should not be to sugar coat the math they hate but offer them a math they can love.” (Papert, 2006)

His vision of Kid Power is another romantic cause we would be wise to adopt (Generation\_WHY, 1998; Papert, 1997, 1998, 1999).

While there was no more a fierce critic of education, his research projects and implementation efforts were based in schools. Why? Because that is where the children are. If you care about kids and learning, then you must work with schools. Papert believed schools were bad places for kids to learn because they were bad places for teachers to learn. Despite the challenges and inevitable disappointments, Papert was not afraid of engaging in the hard work of school reform.

The constructionism community is not alone it is disinterest in, fear of, or contempt for schools. Most graduate schools of education faculty feel the same way; an unacceptable and counterproductive stance that must be reversed. It is lazy, elitist, and anti-intellectual. If you care about learning or children, you must care about schools.

Software environments developed for children to use outside of the classroom feature design constraints that by necessity limit complexity. Such environments or toys are not universally acceptable, and their benefits are not democratized across a diverse population of young people. Their use is susceptible to the usual societal inequities of class, race, economic inequality, and geography. Designing for schools may be harder, but it is more consistent with the better angels of our nature.

“I’ve learned that to think about technology in schools, you have to be careful not to think too much about technology or for that matter about schools. You’ve got to learn to think on a more systemic level about the nature of change and the nature of resistance to change and particularly with an arrow of focus...”

We’ve got somehow to put all these things together. We’ve got to see what we’re doing with the technology as fitting in with systemic trends in this much larger whole. That’s not easy. I find myself constantly torn schizophrenically between two modes of thinking. One mode of thinking: focus on the future

and that future's not far away. It's very easy today to anticipate with pretty secure knowledge that in five or ten years, there would be enormous changes and that in twenty years, unimaginable ones.

But if we look too much at these images of the future, we are filled with amazement and wonder and it's great fun but what does it tell us about what to do Monday when we come into a classroom full of students? On the other hand, if you focus too much on what to do Monday, you are without a rudder. You don't know where to go and I think that on the whole we see that without a vision of the future, the direction that the use of technology in schools pretty well inevitably takes is to reinforce, repair, strengthen old assumptions instead of opening up new vistas about how to think about where it's going to go." (Papert, 1994)

### **2.11 Practical**

Transforming sclerotic systems, like schools, may seem quixotic, but Papert appreciated those efforts, even if their benefit accrued to few children and teachers. Such efforts proved the power of powerful ideas and lit a lantern for others to follow. He was an unlikely changemaker who in many ways earned his reputation as a disheveled, disorganized, and at times unreliable nutty professor. That said, he led the development of technological products that enjoyed commercial success. LEGO Robotics kits, countless dialects of the Logo programming language, and low-cost portable computers are all part of his legacy. I wish he could have lived long enough to see the Raspberry Pi, micro:bit, and \$300 3D printers, although his work was foundational to their development.

We need people to lead in the development of new "Logos" for new computing devices and a new era. The funding model for research and development has changed since the apex of Logo's popularity in the 1980s, but the need for new computational environments for learning is acute.

We need a new "Swiss Army Knife" version of Logo containing a full Logo language, in a modern user interface, with high quality graphics, multiple sprites, multiple forms of output, the ability to control motors, lights, and sensors. Such a Logo would also profit from having the ability to interact with the Web, access large language models, and run on mobile devices. The current variety of specialized Logo dialects (whether they admit being Logo or not) just creates false complexity and confusion for educators and constrains the breadth and depth of projects students can engage in.

### **2.12 Egalitarian**

Seymour Papert knew governors, presidents, CEOs, and scores of intellectuals, but he was never happier than in the company of children. He loved his Maine neighbors and delighted in their lives, which in turn became new learning yarns he would spin for the real people he sought to organize in common purpose against ignorance, apathy, injustice, and malaise.

Papert spent a couple of years on the “rubber chicken circuit” speaking to community groups across the State of Maine when the Governor needed support for his plan to provide every seventh and eighth grader with a personal laptop computer. He was not afraid to do the work necessary to make his vision a reality.

Constructionism is built on the foundation laid by the “Logo community.” Creative teachers were the rocket fuel that propelled the explosive interest in computer programming and constructionism in the 1980s, a time in which Logo not only represented the intellectual frontier of educational innovation but enjoyed its peak popularity and respect. Entire states and nations committed to Logo programming and constructionism in the eighties. At Logo conferences around the world, the most exciting projects were created by teachers and children. Academics followed, studied, and reported on the progress led by an incredibly eclectic universe of classroom educators. We role played recursion and danced procedurally. This was a time of great optimism and aspiration.

This is no misplaced nostalgia. The future of constructionism is dependent on understanding the boom-and-bust cycle experienced by movements such as the Logo community.

### **2.13 Evolutionary**

Constructionism did not begin or end with the publication of *Mindstorms* in 1980 (Papert, 1980). We must continue to grow branches on the tree. One way to do so is to ensure that the work that has already been done remains accessible, read, and discussed.

### **2.14 Political**

Education is an inherently political act. Its quality is dependent on a fully functional democracy and democracy is dependent on an educated populace. The success of Logo was in no small part due to its roots in the peaceful social battles for civil rights, women’s rights, voting rights, integration, and the anti-war movement. Many of the leading Logo-using educators of the 1980s were veterans of those social movements.

Papert himself was a dissident in his native South Africa where he was engaged in the struggle against Apartheid alongside men and women like Nelson Mandela in the 1940s and 50s. Much of his later educational work was conducted in underserved urban communities, with disadvantaged students, and in developing nations. Papert also engaged with local, state, and national leaders throughout his career. We need to follow his example. Activism should be at the heart of constructionism.

At a time of rising authoritarianism, science skepticism, fake news, voter suppression, discrimination, and income inequality, there is an urgent need for children to develop the sorts of thinking and debugging skills afforded by constructionist environments, such as Logo.

Constructionism is a bulwark against fascism. Valuing the centrality of the learner in the educational process is not a radical position. Such extremism is found in instructionism, a form of pedagogical authoritarianism surrendering personal agency to a system seeking one right answer and epistemological homogeneity. For decades, Papert warned about the rise of anti-democratic, mean-spirited, and nonsensical tricks like explicit direct instruction and “the science of reading.”

### **2.15 Playful**

Although deadly serious in his mission, Papert was playful, mischievous, curious, funny, and featured those traits in the learning adventures he shared. His embrace of tinkering, bricolage, and messing about embodied a childlike spirit while illustrating powerful learning principles (Turkle & Papert, 1991). His embrace of hard fun shares the value of playful learning (Papert, 2002).

### **2.16 Uncompromising**

Papert reserved his harshest criticism for those who know better, but refuse to take a stand, speak out, set an example, or worst of all behave in an instructionist manner while posing as a constructionist. Using Logo as a means of instruction, particularly in an instructionist fashion to teach a narrow mathematical concept for a handful of children, or in preparation for a math competition, is at best a mischaracterization of constructionism and the potential of Logo-like environments.

### **2.17 Poetic**

Seymour Papert loved playing with words and conveying powerful ideas through storytelling, jokes, and puns. He even wrote a play for middle school students.

While his scientific bonafides and stature are undeniable, Papert approached science with the heart of an artist. The projects he led and was most interested in represented eclecticism. Connection, passion, and serendipity were prized. He embraced beauty and joy, both in words and deeds. Comparatively, it seems that many in the academy profess an interest in creativity but treat the most aesthetic pursuits with the objectivity of an engineer.

### **2.18 Personal**

Papert embodied the Piagetian principle that “knowledge is a consequence of experience,” (Piaget, 1973) and thus personal. Individual interests, talents, dispositions, and style both inform and display the epistemological pluralism Papert championed. (Papert and Turkle, 1991)

## **3. Conclusion**

Seymour Papert and his colleagues created much to inspire us and even more to build upon. We are indebted to them for their passion, expertise, courage, imagination, empathy, provocation, leadership, and powerful ideas.

This novel dissection of the myth of Seymour Papert is intended as an invitation for dialogue. Only after we collectively remove our blindfolds, unite, connect, and redouble our efforts to engage with a wider universe of stakeholders will we begin to realize our potential. Bad ideas in education are timeless and impervious to geography. Good ideas, like constructionism, are incredibly fragile and need to be nurtured if their vitality is to be sustained.

This paper *is* an explicit plea for more dialogue, diversity, and egalitarianism. This stance is orthogonal to academic parochialism and wholly consistent with the life, work, and style of Dr. Papert.

While egocentrism is sadly predictable within the cloistered walls of higher education, constructionism cannot survive being sequestered in theoretical settings. Severing ties to our roots, seems childish and self-destructive. Any act of erasure, deliberate or apathetic, within a decade of Papert's life particularly troubling. Faulkner describes such efforts as "killing one's darlings" and Harold Bloom's "anxiety of influence" theory suggests that poets find their own voice by misreading their predecessors, often to clear imaginative space for themselves.

Neither tenure or intellectual stature should be achieved by marginalizing colleagues, masters, or pioneers. There is no constructionism without Seymour Papert. We stand on the shoulders of giants. If we do not honor, celebrate, sustain, and elevate their legacy of powerful ideas, who will?

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