

Piaget's Constructivism, Papert's Constructionism: What's the difference?

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What is the difference between Piaget's constructivism and Papert's "constructionism"? Beyond the mere play on the words, I think the distinction holds, and that integrating both views can enrich our understanding of how people learn and grow. Piaget's constructivism offers a window into what children are interested in, and able to achieve, at different stages of their development. The theory describes how children's ways of doing and thinking evolve over time, and under which circumstance children are more likely to let go of—or hold onto—their currently held views. Piaget suggests that children have very good reasons not to abandon their worldviews just because someone else, be it an expert, tells them they're wrong. Papert's constructionism, in contrast, focuses more on the art of learning, or 'learning to learn', and on the significance of *making things* in learning. Papert is interested in how learners engage in a conversation with [their own or other people's] artifacts, and how these conversations boost self-directed learning, and ultimately facilitate the construction of new knowledge. He stresses the importance of tools, media, and context in human development. Integrating both perspectives illuminates the processes by which individuals come to make sense of their experience, gradually optimizing their interactions with the world

Prelude

Let me say, as a prelude, that the beliefs we held about children's learning are deeply grounded in our own convictions on what it means to be knowledgeable, intelligent, experienced, and what it takes to become so. Whether implicit or explicitly stated, these convictions drive our attitudes and practices as educators, parents, teachers, and researchers.

If we think, for example, that intelligence is innate and that talents are given, we are likely to focus our interventions at helping kids unfold their potentials— at the cost of not always giving a chance to those whom we think of as "untalented". If we believe, on the other hand, that knowledge or intelligence are a mere reflection of a child's surrounds, then we are likely to "pass on" our own solutions, rules, and values, to our youngsters. And we may do so at the cost of trivializing their ways of doing, thinking, and relating to the world. And if we believe, as Piaget and Papert do, that knowledge is actively constructed by the child in interaction with her world, then we are tempted to offer opportunities for kids to engage in

hands-on explorations that fuel the constructive process. We may do so at the cost of letting them “rediscover the wheel” or drift away when shortcuts could be welcome.

Let me also say, on the outset, that there is nothing wrong in showing kids the right ways of doing things, in helping them unfold their natural gifts, or in letting them discover things by themselves. Yet, both *inneism* and *behaviorism* (the believe in either “fixity” or extreme malleability of mind] can become a formula for disaster when worldviews are at odds, value systems clash, or when some “unpopular views” stubbornly persist within a community. That’s when we need to ask ourselves, in all simplicity, “who are we to tell the children of others what they should learn, and how? Who are we to know what’s better for others, what’s to be bettered? Such questions become particularly relevant in cultures that are not homogeneous – in multi-cultural groups where different value systems have to learn to co-exist.

My own life-long interest in constructivism and socio-constructivism grows out of a personal belief that wherever ‘diversity’ reigns, centralized planning, or mere transmission of traditional values won’t work. Instead, auto-determination and negotiation – i.e. self-expression and exchanges—are needed.

Psychologists and pedagogues like Piaget, Papert but also dewey, Freynet, Freire and others from the open school movement can give us insights into: 1. How to rethink education, 2-imagine new environments, and 3- put new tools, media, and technologies at the service of the growing child. They remind us that learning, especially today, is much less about acquiring information or submitting to other people’s ideas or values, than it is about putting one’s own words to the world, or finding one’s own voice, and exchanging our ideas with others.

I present some aspects of Piaget’s constructivist theory, and contrast them with Papert’s constructionism. I flesh out what each contributes and tend to leave out. I hope to provide some conceptual hooks for researchers, designers, and educators, to build on.

Jean Piaget (1896-1980)

Piaget's theory provides a solid framework for understanding children's ways of doing and thinking at different levels of their development. It gives us a precious window into what children are generally interested in and capable of at different ages. To Piaget, what's more, children not only have own views of the world (which differ from those of adults), but these views are extremely coherent and robust. They are stubborn, if you wish, not easy to shake. Children in this sense are not incomplete adults. Their ways of doing and thinking have an integrity, a "logic" of its own, that is mostly well suited to their current needs and possibilities. This is not to say that children's views of the world, as well as of themselves, do not change through contact with others and with things. The views are continually evolving. Yet, knowledge, Piaget tells us, expands and plateaus from within, and according to complex laws of self-organization. To conclude, for a child—or an adult—to abandon a current working theory, or believe system, requires more than being exposed to a better theory. Conceptual changes in children, like theory changes in scientists, emerge as a result of people's action-in-the-world, or experience, in conjunction with a host of 'hidden' processes at play to equilibrate, or viably compensate, for surface perturbations (Carey, 1987, Kuhn, 19..).

The implications of such a view for education are trifold: 1. teaching is always indirect. Kids don't just take in what's being said. Instead, they interpret what they hear in the light of their own knowledge and experience. They transform the input. 2. the transmission model, or conduit metaphor, of human communication won't do. To Piaget, knowledge is not information to be delivered at one end, and encoded, memorized, retrieved, and applied at the other end. Instead, knowledge is experience that is acquired through interaction with the world, people and things. 3. A theory of learning that ignores resistances to learning misses the point. Piaget shows that indeed kids have good reasons not to abandon their views in the light of external perturbations. Conceptual change has almost a life of its own.

While capturing what is common in children's thinking at different developmental stages—and describing how this commonality evolves over time—Piaget's theory tends to overlook the role of context, uses, and media, as well as the importance of individual preferences or styles, in human learning and development. That's where Papert's "constructionism" comes in handy!

Seymour Papert (19 --)

Seymour Papert of Massachusetts Institute of Technology developed a theory of learning based upon Piaget's constructivism. Note that Papert worked with Piaget in Geneva in the late 1950's and early 1960's. In his own words: *"Constructionism—the N word as opposed to the V word— shares constructivism's view of learning as "building knowledge structures" through progressive internalization of actions... It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe (Papert, 1991, p.1)*

Because of its greater focus on learning through making rather than overall cognitive potentials, Papert's approach helps us understand *how ideas get formed and transformed when expressed through different media, when actualized in particular contexts, when worked out by individual minds*. The emphasis shifts from universals to individual learners' conversation with their own favorite representations, artifacts, or objects-to-think with.

To Papert, projecting out our inner feelings and ideas is a key to learning. Expressing ideas makes them tangible and shareable which, in turn, informs, i.e., shapes and sharpens these ideas, and helps us communicate with others through our expressions. The cycle of self-directed learning is an iterative process by which learners invent for themselves the tools and mediations that best support the exploration of what they most care about. Learners, young and old, are "word-makers," in Nelson Goodman's sense.

Stressing the importance of externalizations as a means to augment the unaided mind is not new. Vygotsky has spent his entire life studying the role of cultural artifacts—tools, language, people—as a resource for drawing the best out of every person’s cognitive potential. So have many other researchers in the socio-constructivist tradition. The difference, as I see it, lays in 3 things: 1. In the role such external aids are meant to play at higher levels of a person’s development, 2. In the types of external aids, or media, studied (Papert focuses on digital media and computer-based technologies) and more important, 3. In the type of initiative the learner takes in the design of her own “objects to think with”.

To Papert, knowledge, even in adult experts, remains essentially grounded in contexts, and shaped by uses, and the use of external supports and mediation remains, in his mind, essential to expand the potentials of the human mind—at any level of their development. Papert’s constructionism, in other words, is both more *situated* more *pragmatic* than Piaget’s constructivism [or Vygotsky’s socio-constructivism]. This is so even if Papert himself doesn’t make explicit use of the terms when describing his enterprise.

Situated Learning

In the last decade, an increasing number of researchers have come to the view that knowledge is essentially “situated” and thus should not be detached from the situations in which it is constructed and actualized (e.g. Brown J.B & Collins, (1989), Rogoff & Lave, (1984), Bliss, Saljio & Light (Eds), 1999). This growing interest in the idea of situated knowledge, or knowledge as it lives and grows in context, has lead many researchers to look closely at individual people’s ways of knowing, or relating. Consistent with this approach, other researchers have shifted their focus from the study of general stages of human cognitive development to the study of individual or culturally related learning styles, and/or context-dependant developmental paths (Carey, 1987; Gilligan, 1987; Fox Keller, 1985; Turkle, 1984).

Situated approaches to human learning and development are multiple and varied. The one thing they share is that all question the prevalent view among

developmental theorists that abstract or formal thinking is necessarily the highest form of intellectual development. All claim that formal thinking is by no means the most powerful tool for everyone, and not necessarily the most appropriate in all situations. Different individuals may develop their own ways of thinking in given situations and nonetheless remain excellent at what they do (Papert and Turkle, 1991). In all cases, situated approaches to learning revalue the concrete, the local, and the personal! Such a shift has important implications in the fields of cognitive research and education.

Socio-constructivism, culture, and media (Vygotsky)

Whether grounded in action as in Piaget's theory, or mediated through language as in Vygotsky's, most constructivist models of human intelligence remain essentially science-centered and logic-oriented —and so does Papert yet to a lesser extent. Developmental theories, in other words, regard cognitive growth as a slow yet steady move away from intuitive towards rational thinking, or from everyday cognition towards scientific reasoning. Piaget and Vygotsky are no exceptions. Both view the lengthy path towards higher forms of reasoning or 'formal operational thought' ultimately as proceeding from local to general, from context-bound to context-free, from externally-supported to internally-driven (or 'mentalised'). Accordingly, cognitive achievements are gauged in terms of three major acts of distancing: 1. The ability to emerge from here-and-now contingencies (characteristic of practical intelligence), 2. The ability to extract knowledge from its substrate (i.e. from contexts of use and personal goals); and 3. The ability to act mentally on virtual worlds, carrying out operations in the head instead of carrying them out externally (Ackermann, 1991). To both, higher forms of thinking are abstract and “in the head”. To both, one could say, the very scaffolds needed to build a formal edifice should be taken down as soon as the edifice stands on its feet!

This is not so for Papert. In “Epistemological pluralism and the revaluation of the concrete” Papert and Turkle offer a far less canonical view on the mutual roles of formal and concrete knowledge which, to them, both prevail even in adults and scientists. *“Traditional epistemology gives a privileged position to knowledge that is abstract, impersonal, and detached from the knower, and treats other forms of knowledge as inferior. But feminist scholars have argued that many women [and/or scientists] prefer working with more personal, less detached knowledge and do so*

very successfully. It this is true, they should prefer the more concrete forms of knowledge favored by constructionism to the propositional forms of knowledge [favored by traditional epistemology]” (Papert 1991, p.10)

In reclaiming the deeply grounded, experience-based, and subjective nature of human cognition, Papert’s approach reminds us that alternative epistemologies are indeed possible, and that concrete thinking is no less important than figuring out things “in the head”.

To conclusion: Piaget & Papert: Similar Goals, Different Means

Piaget and Papert are both **constructivists** in that they view children as the builders of their own cognitive tools, as well as of their external realities. For them, knowledge and the world are both constructed and constantly reconstructed through personal experience. Each gains existence and form through the construction of the other. Knowledge is not merely a commodity to be transmitted, encoded, retained, and re-applied, but a personal experience to be constructed. Similarly, the world is not just sitting out there waiting to be uncovered, but gets progressively shaped and transformed through the child's, or the scientist's, personal experience.

Piaget and Papert are also both **developmentalists** in that they share an incremental view of knowledge construction. The common objective is to highlight the processes by which people outgrow their current views of the world, and construct deeper understandings about themselves and their environment. In their empirical investigations, Piaget and Papert both study the conditions under which learners are likely to maintain or change their theories of a given phenomenon through interacting with it during a significant period of time.

Despite these important convergences, the approaches of the two thinkers nonetheless differ. Understanding these differences requires a clarification of what each thinker means by intelligence, and of how he chooses to study it.

In appearance, both Piaget and Papert define intelligence as **adaptation**, or the ability to maintain a balance between stability and change, closure and

openness, continuity and diversity, or, in Piaget's words, between assimilation and accommodation. And both see psychological theories as attempts to model how people handle such difficult balances. At a deeper level, however, the difference is that Piaget's interest was mainly in the construction of internal stability (*la conservation et la reorganisation des acquis*), whereas Papert is more interested in the dynamics of change (*la decouverte de nouveaute*). Allow me to elaborate:

Piaget's theory relates how children become progressively detached from the world of concrete objects and local contingencies, gradually becoming able to mentally manipulate symbolic objects within a realm of hypothetical worlds. He studied children's increasing ability to extract rules from empirical regularities and to build cognitive invariants. He emphasized the importance of such cognitive invariants as means of interpreting and organizing the world. One could say that Piaget's interest was in the assimilation pole. His theory emphasizes all those things needed to maintain the internal structure and organization of the cognitive system. And what Piaget describes particularly well is precisely this internal structure and organization of knowledge at different levels of development.

Papert's emphasis lies almost at the opposite pole. His contribution is to remind us that intelligence should be defined and studied *in-situ*; alas, that being intelligent means being situated, connected, and sensitive to variations in the environment. In contrast to Piaget, Papert draws our attention to the fact that “diving into” situations rather than looking at them from a distance, that connectedness rather than separation, are powerful means of gaining understanding. *Becoming one with the phenomenon under study* is, in his view, a key to learning. It's main function is to put empathy at the service of intelligence. To conclude, Papert's research focuses on how knowledge is formed and transformed within specific contexts, shaped and expressed through different media, and processed in different people's minds. While Piaget liked to describe the genesis of internal mental stability in terms of successive plateaus of equilibrium, Papert is interested in the dynamics of change. He stresses the fragility of thought during transitional periods. He is concerned with how different people think once their convictions break down, once alternative views sink in, once adjusting, stretching, and expanding their current view of the world becomes necessary. Papert always points toward this fragility, contextuality, and flexibility of knowledge under construction.

Last but not least, the type of “children” that Piaget and Papert depict in their theories are different and much in tune with the researchers' personal styles and scientific interests. Note that all researchers ‘construct” their own idealized child.

Piaget's “child,” often referred to as an epistemic subject, is a representative of the most common way of thinking at a given level of development. And the “common way of thinking” that Piaget captures in his descriptions is that of a young scientist whose purpose is to impose stability and order over an ever-changing physical world. I like to think of Piaget's child as a young Robinson Crusoe in the conquest of an unpopulated yet naturally rich island. Robinson's conquest is solitary yet extremely exciting since the explorer himself is an inner-driven, very curious, and independent character. The ultimate goal of his adventure is not the exploration as such, but the joy of stepping back and being able to build maps and other useful tools in order to better master and control the territory under exploration.

Papert's “child,” on the other hand, is more relational and likes to get in tune with others and with situations. S/he resembles what Sherry Turkle describes as a “soft” master (Turkle, 1984). Like Piaget's Robinson, s/he enjoys discovering novelties, yet unlike him, s/he likes to remain in touch with situations (people and things) for the very sake of feeling at one with them.³ Like Robinson, s/he learns from personal experience rather than from being told. Unlike him, s/he enjoys gaining understanding from singular cases, rather than extracting and applying general rules. S/he likes to be engaged in situations and not step back from them. S/he might be better at pointing at what s/he understands while still in context, than at telling what s/he experienced in retrospect.

Integrating the views

Along with Piaget, I view separateness through progressive decentration as a necessary step toward reaching deeper understanding. Distancing oneself from a situation does not necessarily entail disengaging, but may constitute a necessary step toward relating even more intimately and sensitively to people and things. In

any situation, it would seem, there are moments when we need to project part of our experience outwards, to detach from it, to encapsulate it, and then reengage with it. This view of separateness can be seen as a provisory means of gaining closer relatedness and understanding. It does not preclude the value of being embedded in one's own experience.

On the other hand, Papert's view that diving into unknown situations, at the cost of experiencing a momentary sense of loss, is also a crucial part of learning. Only when a learner has actually traveled through a world, by adopting different perspectives, or putting on different “glasses,” can a dialogue begin between local and initially incompatible experiences.

To conclude, both “dwelling in” and “stepping back” are equally important in getting such a cognitive dance going. How could people learn from their experience as long as they are totally immersed in it. There comes a time when one needs to translate the experience into a description or a model. Once built, the model gains a life of its own, and can be addressed as if it were “not me.” From then on, a new cycle can begin, because as soon as the dialog gets started (between me and my artifact), the stage is set for new and deeper connectedness and understanding.

In his book, *The Evolving Self*, Kegan elaborates on the notion that becoming embedded and emerging from embeddedness are both needed to achieve deeper understandings of oneself and others. To Kegan, human development is a lifelong attempt on the part of the subject to resolve the tension between getting embedded and emerging from embeddedness (Kegan, 1982). In a similar way, I think of cognitive growth as a lifelong attempt on the part of the subject to form and constantly reform some kind of balance between closeness and separation, openness and closure, mobility and stability, change and invariance.

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