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# Introduction

## Leaping Across the Silos

This is a book about learning, language, and literacy. It's also about brains and bodies. And it's about talk, texts, media, and society. These topics are usually studied in different narrow academic silos. Yet they are all part of one interactive process: the process of human development (Center for the Developing Child at Harvard University, 2016). If we move across all the relevant silos, rather than diving deeply into only one, we can gain a bigger picture of how children and adults learn and develop.

Here is a snapshot of the big picture this book will develop, of the forces and processes that influence learning and development, and of needed adjustments in a new age:

Design (BEING) →  
Experience (DOING) →  
Mentoring →  
Memory →  
Sense-Making/Future Planning/Pattern Recognition  
(KNOWING) → Talk/Texts/Media →  
Generalizations →  
Affinity (Motivation, interest, maybe even passion  
grows) → (BECOMING)  
Self-Teaching →  
Identities (BEING)

In sum, people who *are* something (parents, teachers, gamers, cooks, gardeners, physicists, etc.) design motivating environments in which children and newbies (adults new to an area) have experiences that lead to good learning. Such experiences involve learners DOING things, taking actions whose outcomes they really care about.

In these designed experiences, children and newbies get help from mentors and teachers to know what to pay attention to and how best to store a useful memory of the experience in long-term memory. In turn, children and newbies use these memories to make sense of things going on around them, to prepare for future action, and to find patterns and subpatterns across their experiences that eventually constitute general knowledge, that is, KNOWING.

Children and newbies need lots of talk with adults or more advanced peers about how to think about experience and how to test patterns for accuracy, if generalization is to work well. They also need critical capacities to use texts and media of all sorts to engage in drawing accurate and useful generalizations from experience and evidence.

As part of this whole ongoing process—and via their trusting collaborations with teachers and mentors—children and newbies, over time, build up motivation, interest, and maybe even passion for certain forms of knowledge, ways of producing that knowledge, and values that they can eventually share with others with similar commitments in the world. They gain an affinity for something that can lead to affiliations with other people and their goals and values. They are preparing to BECOME something.

As these processes of development unfold, children and newbies become (we hope) deliberate learners who know how to teach and mentor themselves and how to design good learning environments for themselves. At this point they have BECOME, for example, members of a family or community, committed students, gardeners, citizens, gamers, teachers, citizen scientists, biologists, activists, and so on, through many possibilities.

We often think of learning and development as happening inside our brains and bodies, but we humans have a very inaccurate view of what our brains and bodies—and, indeed, our very selves—really are and do. The brain is crucial to learning, of course. But a person actually has two brains, not one: One brain is in our head and another is in our gut, and the gut brain communicates to the head brain and strongly influences our mental health and how we feel, think, and behave (McAuliffe, 2016; Yong, 2016).

Science is just getting started on studying the brain and the body at this level. Much remains to be discovered, and important new results are coming fast and furious. Recently the neurosurgeon James Doty (2016) argued that we have a third brain, the heart. We think of our head brain as making free decisions for which we are responsible. But

the vast majority of the brain is composed of modules (subsystems) that make decisions about how we feel, think, believe, and behave in ways that are inaccessible to our conscious awareness. The conscious part of our brain largely plays catch-up, by trying to make up good stories about why we feel, believe, and behave as we do, especially when the conscious brain does not know the relevant processes of the rest of the brain that lead us to think, behave, or feel as we do (Gazzaniga, 1988, 2011). The understanding that it is often our gut that is doing the thinking makes it more important than ever that we become reflective thinkers and also test our thinking in collaboration with others.

We think of memory as providing an accurate record of the past. But in reality human memory is as much about the future as it is about the past, or more so (Marcus, 2008; Renfrew, 2009). We use our memories to make sense of things, prepare for future actions, and create stories about ourselves and our lives. As we do these things, we change our memories in ways based on the uses we have made of them. Thus, human memory changes over time and is not very good at factual accuracy about the past (Loftus, 1976).

Learning and development require a head brain and a gut brain; they require a body. They also require a society. Learning and development—a person's knowing things, being able to do things, having an identity—are all reciprocal and interacting processes among brains; bodies; environments; other people; and the social, cultural, and institutional groups into which people fall.

Humans learn from experience. You have to have a body to have an experience. And for most experiences you have to have social interactions with other people. Though researchers often use computers to model human learning, computers do not have bodies and so cannot have experiences. A computer at a restaurant might correctly pair the right wine with one's favorite dish, but it will never know how that food tastes and feels on the palate. And computers cannot have social interactions. A computer can have a "conversation" with a human, but it will never know or feel the heft, the warp and weave, of human needs, fears, hopes, and desires. Thus, computers cannot and do not learn and develop in the way humans do.

What develops is not just an organism, an individual, a child, but an immensely complex system. Research on interacting brains, bodies, and environments has long concluded that each of us is as complex as the universe, indeed probably more so (Marcus & Freeman,

2015; Swaab, 2014). This is why narrow silos can be dangerous when we deal with learning and development. Wrong ideas here can do real harm.

Learning and development today take place in a different world from that of the past. Humans across the globe face serious risks, dangers, and disasters from interacting complex systems that are on the verge of going out of control. These are systems like massive inequality, environmental degradation, global warming, vast migration flows, a global economy based on streams of numbers in computers, religious and cultural conflicts, the loss of many jobs, and the transformation of work as a result of new technologies.

Our world today is so complicated—and human individual intelligence so frail—that we all need to learn how to engage in collective intelligence. Collective intelligence means networking together diverse people and smart tools in the right ways to solve hard problems beyond the grasp of any one person, skill, or method (Nielsen, 2012).

Research on collective intelligence has amply demonstrated that in order to function well, smart groups need to be diverse (Brown & Lauder, 2000; Leimeister, 2010; Surowiecki, 2004). However, the big categories that we usually think represent diversity—race, class, gender, and ability—sometimes do more to efface diversity than to capture it. For collective intelligence, the diversity that counts is the different ways different people have worked out to be things like Asian Americans, women, members of the working class, or individuals with a learning disability, given their specific experiences and contexts in life.

Narrow specializations in narrow academic silos have brought us a great deal of progress in science. But times are changing. When we face highly complex problems, narrow expertise can become dangerous. Narrow experts tend to underestimate and undervalue what they don't know (Harford, 2011; Jenkins, 2006; Weinberger, 2012). They tend to think that their methods answer complex questions that, in reality, go well beyond their area of expertise. And they tend to engage in “groupthink” as they converge in their narrow echo chambers, advancing paradigms that are not tested against the results of other silos.

We are all aware that, thanks to digital technologies, opportunities for learning have become ubiquitous outside school. What fewer people realize is that teaching has also become ubiquitous outside school. Some people are using the Internet and other electronic means to

become uncredentialed experts (and not just self-proclaimed experts, but fraudulent ones, of which there are many too, of course) (Anderson, 2012; Hitt, 2013). They work together to produce knowledge, citizen science, media, products, and inventions that rival what credentialed experts can do, certainly what they can do alone. But they also organize themselves into what I call *affinity spaces*, places where teaching of all different sorts goes on (Gee, 2013; Gee & Hayes, 2010).

When we talk about learning and development today we have to put school into the larger context of diverse teaching and learning practices, diverse literacy and media practices, and diverse things to know and be, in and out of school. Isolating school from teaching and learning out of school will harm children and lead to even greater inequality of opportunity and results.

Regardless of how we think about traditional narrow experts and their silos, thinking in terms of only one silo will not do for parents, teachers, or policymakers. Development does not happen in silos and does not separate the many topics we are trying to integrate in this book. The information parents, teachers, and policymakers must draw on, and even help us discover, resides in no one single silo or even in just a few. And, of course, not all we need to know is academic in any narrow sense.

Generalizing, in order to view the big picture, can be dangerous, of course. It is easy to overlook important details in the gold mines of knowledge that constitute our academic silos. It is easy to be wrong, though thankfully being wrong is often a good thing (Gee, 2013; Harford, 2011). However, *ignoring* the big picture is much more dangerous. Seeking to help and provide resources to people with but one tool or remedy is often shortsighted and harmful. It is particularly dangerous today when many of the problems we all face are multifaceted and complex.

A problem every parent and teacher confronts is how to help children develop into healthy, flourishing humans in a very complex and high-risk world. Furthermore, how can they continue to develop and flourish in a world where drastic change will be the norm? These are hard problems. The answers require connecting, integrating, and finding synergies among all the topics we will deal with in this book.

The claims in this book are not meant to be taken at face value as undeniably true. I hope they are true, but if they are not I want us to come together to identify where they need work and how we can

improve them. *My goal is to be as clear as I can about my perspective on learning and development so that you, the reader, can reflect on your own. Perhaps, in the process, you may learn more about your own perspective; possibly deepen it; and, if you feel the need, change or transform it by contrasting and comparing it with mine and with others'. That is my goal for myself as well. The goal of my writing is not conversion, but mutual mulling.*

In a world where a great many people are profoundly harmed by injustice, hatred, and fear, I do not know the exact right place to go to make things better. All I have are some suggestions about the journey we might take together. And I have a fervent hope that we will find good places to go together on a journey that may nonetheless never reach a final resting place. The journey itself is our hope.

Just as this book attempts to escape narrow academic silos, it also seeks to address a wide range of readers. I want to address teachers and parents, activists young and old, policymakers, and academics from various fields; my goal is to reach those who care about learning and development in the contemporary world.

In the book, I use a number of examples that are drawn from my own life and experiences. I do so for two reasons: First, I want to avoid talking about other people's lived realities, especially people who may not see me as sufficiently like them to give me the right to speak about them. Second, I want to encourage all my readers, whoever they are, to see their own unique lived experiences as sources of crucial information for how we might save ourselves together, before we all perish alone, each in his or her own separate capsizing boats, on a violent sea.