It is common today to see positive accounts of out-of-school learning compared to negative accounts of in-school learning. Too often, though, these comparisons are between good examples of out-of-school learning and bad examples of in-school teaching. What is needed are comparisons of good out of school learning to good in-school teaching.

 It is also common today to discuss out of school learning as "informal" and in-school learning as "formal". The comparison usually assumes that out of school learning has no teachers and in-school learning is teacher-directed.   In reality, though, I would argue there are four categories here: out of school informal learning, out of school formal learning, in school formal learning, and in school informal learning. Furthermore, there is almost always teaching going on in all these forms of learning.

 Some people contrast school as a place where adults intervene (teachers) and out of school learning as a place where adults do not intervene and kids "geek out". However, most out of school learning involves media designed by adults. Video games and card games like *Magic the Gathering*, for example, are designed by adults as a direct intervention into young people's learning (if only because if they cannot learn the game, they cannot play it and will not buy further products like it).

 Most any interest-driven site on the Internet will show examples of both informal and formal learning. A *Yu-Gi-Oh* site will have discussions and matches where people can learn informally and will also contain tutorials where they can learn more formally. Most schools will show examples of both formal and informal learning. In mathematics, for example, a teacher may give a lecture, but in another activity the teacher may have students engage in collaborative problem solving under their own steam.

 Why are teachers and teaching necessary? Vygotsky gave a good answer to this question long ago. When I have to learn something new I have to learn two things: a new skill and the "right" way to do it. What counts as the "right" way to do something is determined by the social groups who do it. We do not as asocial individuals determine what counts as a good reading of an Emily Dickinson poem, what counts as a good way to carry out an experiment, what counts as a proof in mathematics, what counts as French cooking, or what counts as playing a video game well. These are all things connected to practices of groups who determine among themselves how things should be interpreted and what counts as "appropriate" and "good".

 Even if you want to react against the norms and practices of a group, you cannot do so until you understand them sufficiently to undermine them. It is hard to critique and resist what you do not know and understand.

 When I am a beginner, a teacher helps me to do together with him or her something that I cannot yet do alone (let's call this "scaffolding") AND imposes his or her

interpretation (from a given social group) on what we are jointly doing. This is Vygotsky's Zone of Proximal Development and, yes, there is direction and even "colonization" in the zone. As a beginning birder I, in fact, want to be colonized by the group. Colonization is only bad when we did not ask for it. Otherwise it is necessary.

 Anything or any person who can allow us to do together what we cannot yet do alone and that imposes an interpretation from a social group on us, an interpretation we do not yet have and cannot make up and enforce on our own, is a "teacher". This could be a more advanced peer (or peers), an adult (or adults), or it can be the design of a medium or technology for learning. Teaching involves scaffolding and imposing an interpretation. The goal of good teaching is to lead learners to be able to teach themselves. I will discuss self-teaching below, but people do not usually start with self-teaching. Often when we romanticize young people learning out of school, we do so by ignoring the role teaching played earlier in the course of their learning.

 When we leave self-teaching aside, we can discuss formal and informal learning in and out of school, all four categories of which involve both teachers and learners. Here are some examples:

1. Informal out of school learning: Children learning to play *Yu-Gi-Oh* by playing it with others or against a computer. The teacher here is the peer group or the computer and the design of the game (which guides learning and action)

2. Formal out of school learning: A child consulting a tutorial on *Yu-Gi-Oh* online or being given explicit help or information by a peer while playing. The teacher here is the tutorial or the peer.

3. Formal in school learning. A teacher giving a lecture or a demonstration in school. The teacher here is the teacher, whether the "official" teacher or someone else (e.g., a parent, peer, or visitor).

4. Informal in school learning. Children engage in a collaborative problem solving practice. The teacher here is the peer group and the design that the teacher has put in place for collaborative learning.

 So what really is the distinction between "formal" and "informal"? It is not the presence or absence of teachers and teaching. Formal learning involves overt instruction, whether it occurs in or out of school. Informal learning does not. Often formal and informal learning alternate within the same activity. Teaching can involve overt instruction (and, thus, be formal) or it can involve resourcing learners with the tools and participatory structure and practices they need to engage in individual or peer learning without formal instruction. We often forget that when young people do things together, some adult has already intervened, whether a parent, teacher, or designer. Some people

who have come before and were "experts" of some sort have resourced and helped structure the activity.

What is instruction and why it is necessary? Instruction is overt showing (modelling) or telling or both together. Why is it necessary? Instruction is often useful and necessary for imposing an interpretation. It is also often useful and necessary for "marrying" language and the world so that learners can articulate what they know and proactively manage their own learning, problem solving, and engagements with the world.

At some level, most learning involves and is even a form of language learning. When we learn to bird, to do physics, or to cook, we learn a language that goes with birding, physics, and cooking. The language allows us to turn some of our tacit knowledge into overt knowledge, to think about what we are doing at a meta-level, and to manage our own learning and engagement.

Most forms of learning involve learning to see the world in new way, often by using new tools and joining new groups.   When we learn to bird, we learn to see and identify and talk about birds in new ways. When we do physics, we learn to see and identify and talk about the physical world in new way. When are learn to cook, we learn to see and identify and talk about food in a new way. When we play the video game *Portal*, we learn to see and identify and talk about the virtual world of a game in a new way, thanks to the portal gun the game gives us and the game's design (which teaches).

Learning a new language—a new way with words—is also a form of colonization. The language—which was invented and is sustained by some social group—imposes an interpretation on the world and what we do in and with it.

We often hear that people learn "from experience". This is both right and wrong. It is true that is hard to learn how to marry news forms of language to the world when you have never mucked around in the world the language is about. Words do not mean by definitions in terms of other words, they mean by being associated with images, actions, experiences, practices one has been part of. However, people learn best when they know what to pay attention to in an experience, how to manage that attention, and when they have a clear goal and know what it means to accomplish that goal up to some standard set by a social group. This is to say, that learners need to engage in deliberate and mindful goal-directed practice in the world, not just in experience.   This requires initially teaching as modelling and instruction and resourcing. Good teachers prepare students for experience and constrain and design the experiences for optimal learning.

I said above that the goal of teaching—in and out school—should often be to allow the learner to eventually become a self-teacher. What is a self-teacher? A self-teacher is a person who can manage their own learning by seeking out challenges, design their own

experiences for the best results, and manage their own deliberate and sustained practice and persist past failure and frustration. This is the goal of good in school teaching and the goal of the highest value-added out of school learning.

 In our rush to decry the horrors of our test-prep schools and romanticize the creativity and passion of kids out of school, we have often left teachers and teaching out. The research in education has shown that good teachers are the most important influence on student achievement and that a bad teacher can have bad results on a student for years. Sadly, lots of teaching in the United States is, while not necessarily bad, mediocre, thanks to the poor training most Schools of Education give and the lack of professional autonomy under which most teachers today must suffer. This blinds us to that fact that good teaching looks a lot alike in and out of school. It blinds us to the fact that adults, peers, and designers instruct and resource for learning. It blinds us to the necessity of instruction as fundamental to the Zone of Proximal Development and to the induction of young people into the world of social groups and the standards they have set for mastery and problem solving in the world.