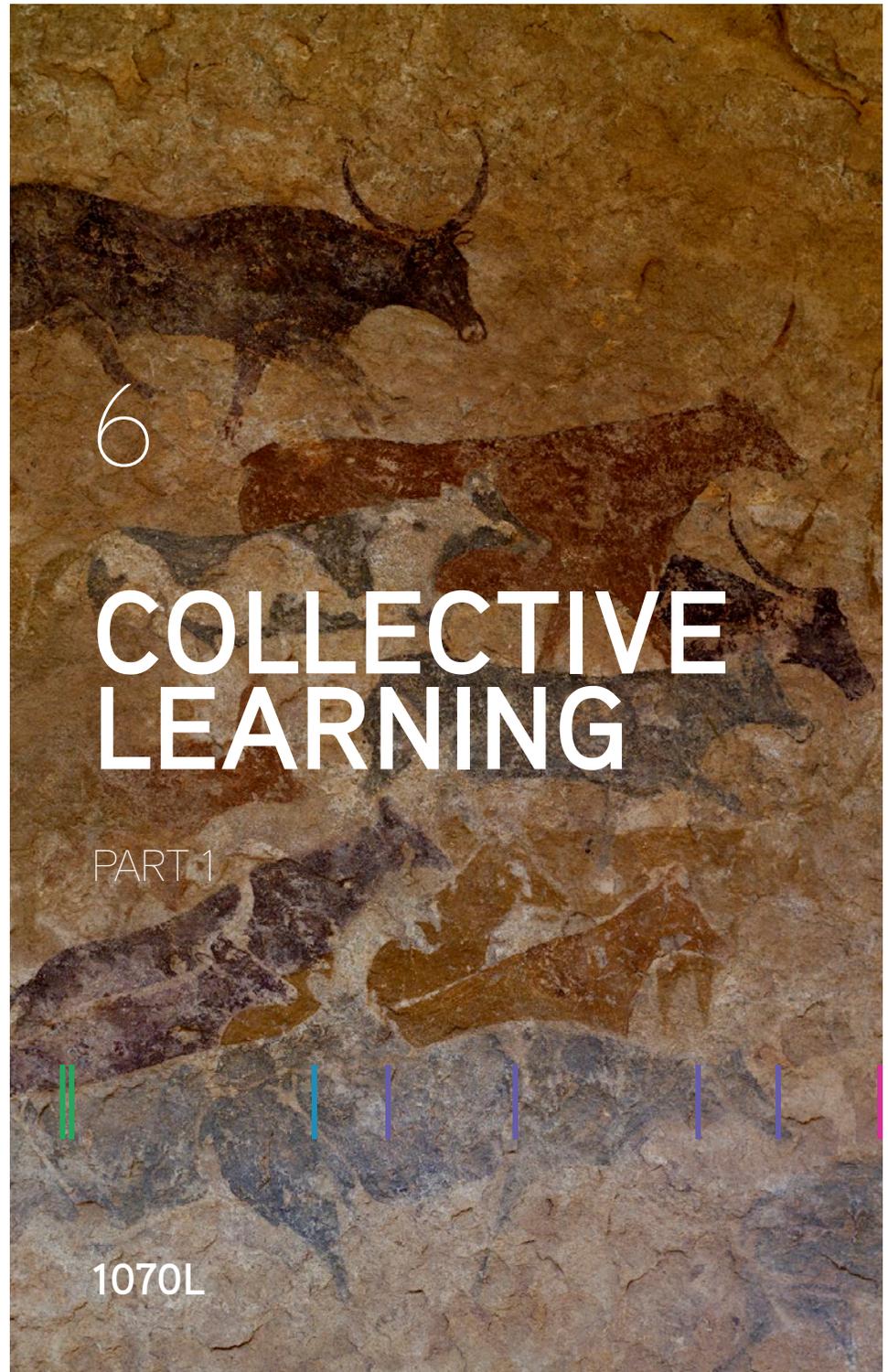




BIG HISTORY PROJECT



6

COLLECTIVE LEARNING

PART 1

1070L

COLLECTIVE LEARNING

USING LANGUAGE
TO SHARE AND
BUILD KNOWLEDGE

By David Christian

In the first essay of a four-part series, David Christian explains what collective learning is and why it makes us humans so unusual.



Collective learning relies on the sharing of information through networks

What is collective learning?

Look at the technology around you: your phone, your computer, your car. Think about how complicated it was to create these technologies. Now ask yourself: If, during your lifetime, you could never speak to another human being, how much of that technology could you dream up? How much of it could you actually build? No matter how smart and creative you might be, the answer is probably simple: “Not much!”

The same is true of other aspects of human societies: religions, legal systems, literature, and sciences. Each of us is pretty smart, but all that makes up human culture is not the product of individual geniuses. Instead, all the many different things that express the astonishing creativity of our species were slowly built up over time as millions of individuals shared their ideas over many generations.

The power of information

A species with lots of information about its environment can exploit its surroundings more effectively. To feed herself and her cubs, a lioness needs to know where to hunt prey. If she doesn't have this information, she and her cubs will die! But if she can learn about the movements of, say, antelopes, she will have a steady diet and will prosper, probably having more offspring.

But the lioness is still like a stand-alone computer — she has only as much memory as she can accumulate in her lifetime. Humans are more like networked computers, with a (more or less) infinite capacity for memory to expand. Because of how we can communicate and share knowledge, we can tap into a vast information network assembled by millions of humans, living and dead. No one person knows it all. Human knowledge is distributed among individuals, shared when necessary, and passed on and added to by each generation.

For example, in early foraging societies, elders passed on what they knew to younger individuals. They taught how to hunt, what seasons were best for particular foods, and what social rules would allow one to travel through a neighbor's territory. As a result, each human gained access to knowledge that had been generated by previous generations, and each individual could add to that body of knowledge. Our species has a colossal amount of information about the world and, therefore, a lot of power.

Collective learning empowers humans in another way, too, because individuals who share information can work together efficiently. In fact, we humans now share information so efficiently that we can collaborate in teams of people stretching across the entire globe. No other creature is capable of teamwork on this scale.

Sharing information doesn't give us power just over our surroundings. It also gives us power over other humans. Powerful individuals or groups are usually those with the most information. Well-connected individuals also have larger networks and can form larger and more powerful alliances. Information really is power!

Language and human history

If the sharing of ideas is so important, why don't chimps exchange ideas the way humans do? It's probably not because they aren't smart enough. The problem is in the sharing. Chimp language does not allow chimps to share enough information with each other.

To get an idea of those limitations, and of how powerful human language is, try telling a friend how to play football without talking, writing, or drawing. With gestures you can really only exchange ideas about what is right in front of you. You need to be able to talk about the future and the past, about distant landscapes and ones that don't yet exist.

Think of the power of a simple phrase such as "pink elephant." By saying those two words, I can plant in your mind a picture of something that does not exist and never will. Chimp language cannot do such things, but humans routinely exchange word pictures like that every day. This ability for "symbolic language" has allowed us to cross a major threshold in our ability to communicate: that of collective learning.

Human language explains why we can share ideas in such rich detail and across generations. Over perhaps 200,000 years, humans have built and stored a vast body of technologies, rituals, stories, and traditions that provide more and more powerful ways of dealing with our surroundings and with each other.

That's why I believe collective learning is the key to understanding human history!

When did collective learning begin?

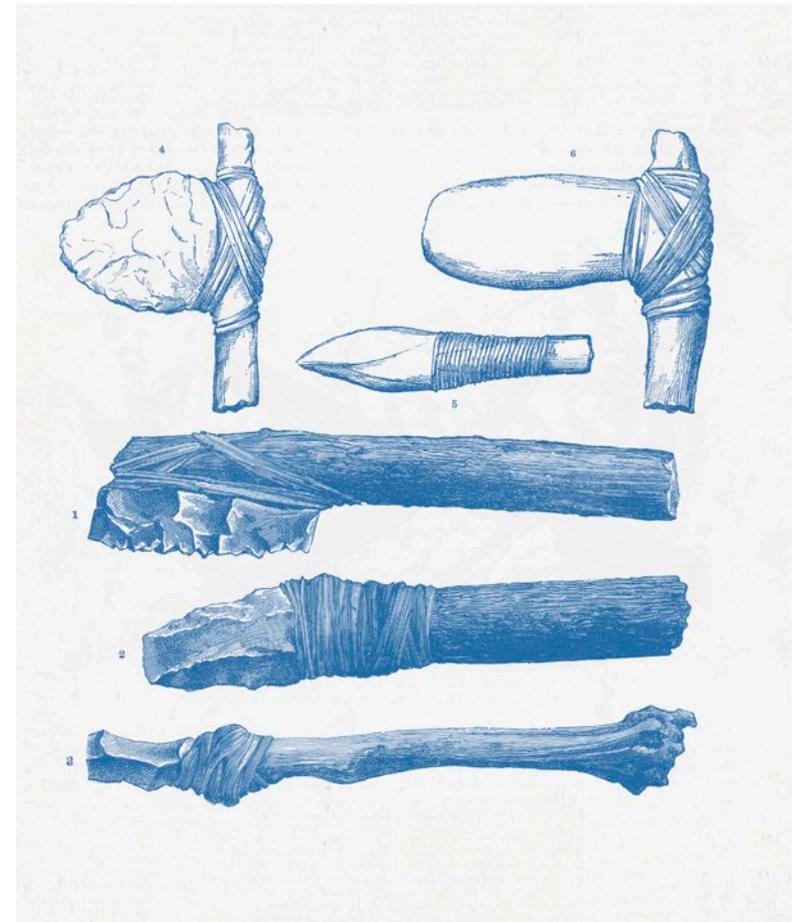
That's really a way of asking, "When did human history begin?" To tackle this difficult and important question, we need to approach the problem like an archaeologist.

If you were an archaeologist, what would you expect a species capable of collective learning to leave behind? What evidence might you find? One possible answer: technologies such as stone tools. That's exactly why Louis Leakey thought that we should regard *Homo habilis* as humans. As early as 2 million years ago, they were making simple stone tools. But there's a problem. Thanks to the work of Leakey's protégé Jane Goodall and other primatologists, we now know that chimps can make tools; for example, they use twigs to get tasty termites out of termite mounds. In fact, lots of animals use tools, but none seem to accumulate new technologies over time as well as humans do.

On the other hand, by about 50,000 years ago, we know that some humans had migrated to Australia. To do so they must have crossed approximately 40 miles of open water, thus possessing great boat-building and navigational skills. At the same time, in Eurasia, new types of tools and new kinds of art and sculpture started to emerge.

But collective learning likely predates 50,000 years ago. At sites in Africa, there is tantalizing evidence for innovative thinking and new technologies from 100,000 years ago or even earlier. Delicately made stone tools may have appeared 200,000 years ago. At sites like Blombos Cave in South Africa — where there is evidence of human habitation almost 100,000 years ago — we also find ochre, a rock whose dust can be used to paint the body. If people were painting themselves they may have been thinking in new ways, suggesting a richer form of language.

We also find signs that people learned to attach stone blades to sticks. This technique, "hafting," is unique to humans and illustrates how collective learning works. As the use of small stone blades became widespread, we presume that these early humans knew how to use their sharp stone edges to shape wooden spears or digging sticks. We also know that foragers often used natural resins and fibers to carefully bind shaped blades to shafts, to form spears or arrows. Combine these ideas and you have a new technology: hafting.



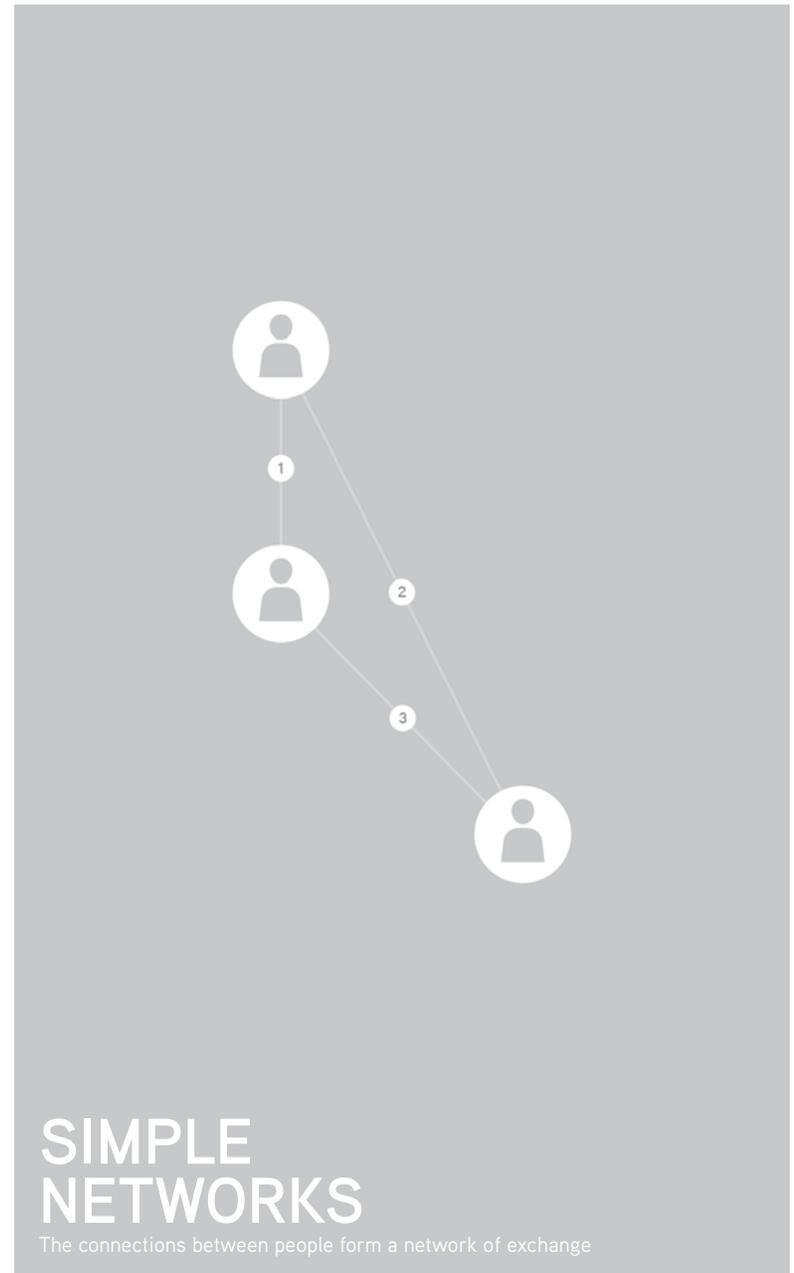
Hafted tools demonstrate that early humans learned collectively

A model of collective learning networks

Now we need to start thinking about how collective learning works in different periods of human history. The diagram opposite is a very simple map of the relations between three people (or perhaps three groups of people). We will use it to help us think about how humans exchange information and how these exchanges have shaped human history. You can imagine this as a map of information exchanges or collective learning between individuals in a few small communities of foragers.

Could you draw a similar map of relations in your classroom? How similar would it be? You might find small clusters of close friends, but you would also find that some individuals have more links than others. And you'll find that some individuals have links that reach well beyond their own clusters of friends and well beyond the classroom. If you map all the links you'll find that it's the long-distance links that hold entire networks together and ensure that information can circulate through the whole network.

As the course progresses we'll look more carefully at the relationship between networks and collective learning, and how this has affected human history.



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Cave paintings of cattle at Tassili N'Ajjer, Algeria
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