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APPROACHES TO KNOWLEDGE

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BIG HISTORY PROJECT



APPROACHES TO KNOWLEDGE

By Bob Bain

How do people create knowledge? It starts by being puzzled, curious, or even confused about the world. There's a sense of wonder in it all.

Here in a library, surrounded by books, I've set out to write about knowledge. Libraries make such appropriate places to discuss knowledge because their purpose is to store knowledge — that's why communities build them. In many ways, libraries are repositories of collective learning, an idea that is very important in the Big History course.

In this library and others, knowledge exists in many forms: books, maps, films, videos, CDs, and, of course, textbooks.

The Big History class does not have a textbook, but it's still useful to think about them and the knowledge within.

I'll tell you how I approached textbooks when I was in school and how most of my high school and college students approach their textbooks.

They typically ask one big question: "How do we get the stuff out of that textbook and into our heads or, more important, onto the tests?" And frankly, that was the question I asked as a student: "How can I get the facts out of the textbook and onto the test?"

Big History asks questions about knowledge

In Big History, we ask a very different question: "How did that knowledge get into the textbook?" How did people discover the facts or create the ideas that are in our textbooks or in our courses?

Did you ever wonder how people create knowledge? Well, in this course you are going to meet many people who discovered or created the information that is in your textbooks. You will meet cosmologists, physicists, geologists, biologists, historians, and more. They are excited to tell you what they have learned. But they are also excited to tell you how they learned it. They are going to tell you how people in their field approach knowledge, the questions that interest them, and how they used intuition, authority, logic, and evidence to support their claims.

In Big History, we want you to pay attention to the questions these scientists and scholars ask and the tools and evidence they use to answer their questions.

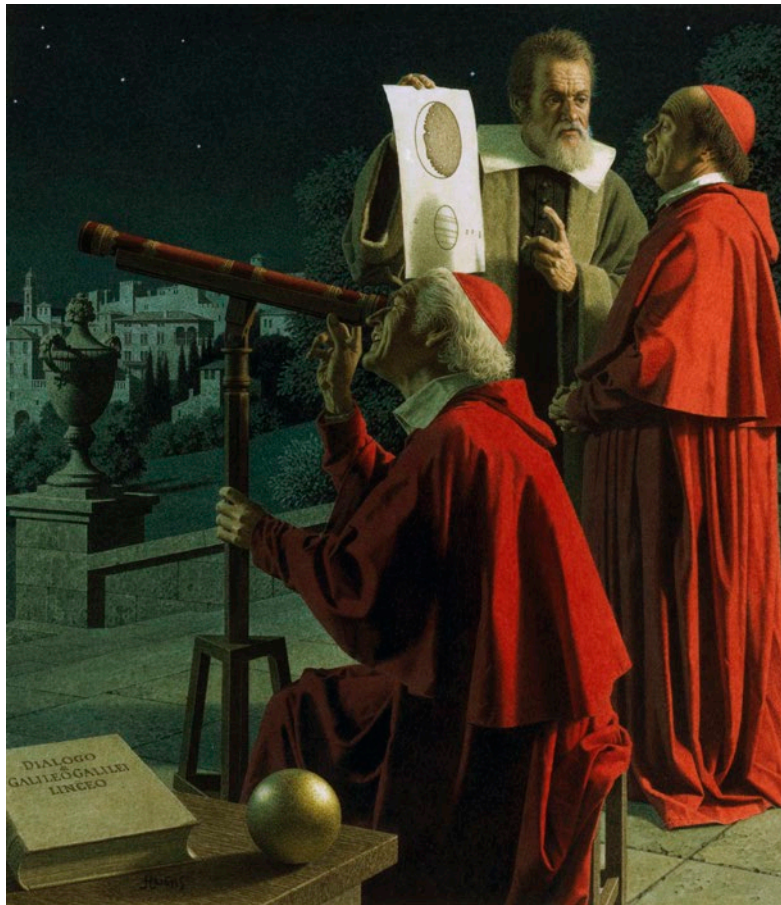


Main Reading Room at the U.S. Library of Congress, Washington, D.C.

Questions, tools, and evidence

Let's look more carefully at how scholars use questions, tools, and evidence to create or discover ideas, facts, and knowledge.

Most of the scholars you'll meet in this course begin their investigations with questions. They are puzzled, curious, or even baffled about the world around them. Sometimes their inquiry begins in wonder.



A painting of Galileo explaining observations made with his telescope

Unlike textbooks that place questions at the end of learning, scholars pose the questions first and use them to drive forward their learning.

Have you noticed that your teacher, the Big History units, and David Christian's videos all use questions — big questions — to launch your study?

Before conducting an inquiry, scholars speculate or make a thoughtful guess about what they'll learn. We often call these thoughtful guesses "conjectures" or "hypotheses." But a question or a hypothesis isn't knowledge yet. Scholars need to gather information to answer their questions. As you'll learn in later units, sometimes people create or use new tools to help them gather new information. For example, Galileo used a telescope he made to collect new data about the heavens and the planets.

Scholars turn information into evidence to support claims

Gathering information does not automatically answer scholars' questions. The information must also be organized, analyzed, and then evaluated to see if it answers the initial or driving questions.

Scholars may then make claims that answer their questions, and use the information as evidence to support their claims. The stronger the evidence, the better the support for the claim — and the greater chance it has to enter a textbook, for others to learn about it.

Scholars must show how they answered their questions

Let's review. In this essay, I wondered how knowledge gets in textbooks and, in answer to my question, I have described a few steps:

- First, scholars have questions or they are curious or puzzled about something.
- Second, they make a conjecture — a thoughtful guess or hypothesis.
- Next, they gather information to answer the question, often using new tools in the process.
- They then analyze the information, think about it, and, perhaps, use some of it to answer their question.
- Scholars use information as evidence to support or make their claims.
- When claims become well supported, they enter textbooks for students to learn.

But the scholars' work is still not finished. They also must share what they learned and show how they learned it. Why do they have to show how they learned it? Isn't simply telling what they learned enough? Why must they also explain how they conducted their investigation, how they analyzed their information, and how they supported their claims?

Scholars want to contribute to collective learning. They want people to see how they arrived at their claims and what evidence supports the claims.

They do not want people to simply trust their claims based only on intuition, logic, or authority.

Scholars also want others to improve their claims. This might involve using new tools or new methods to gather new evidence to support or challenge the claims. Or it might mean asking a different question entirely.

Different approaches to knowledge

All scholars ask important questions whether they are archaeologists, anthropologists, biologists, or experts in another field. They all make conjectures, gather data, and analyze it to make claims, but there are differences among and between these individuals. While they all ask important questions, make conjectures, gather data, and analyze it to make claims, there are differences among and between these scholars. They all begin asking questions, but they ask different questions. They all have ways to gather data, but they often have different ways to gather data.

As you meet the instructors in this course, do more than just learn what they are teaching; try as well to understand how they do their work, what questions they ask, and how they answer their questions. You might ask each of them:

- What are the big questions that have interested you and driven you to personally pursue the answers?
- What were your guesses, speculations, and hypotheses?
- How did you collect your evidence?
- Where did you see the patterns in your evidence? What did those patterns seem to indicate?
- What were your biggest ideas?
- How did you make your ideas public?
- Why should others believe your ideas?
- When and why have you changed your mind?

Make sure to pay attention to big questions that haven't been answered. These are questions that you and your friends might take up. Who knows? Maybe you can contribute to the textbooks of the future.

Big History's approach to knowledge

As you might have already guessed, in Big History we ask lots of big questions. We're going to ask questions about the physical world, the living world, and the human world. This will require us to use many different approaches to knowledge. One of the most exciting things about Big History is that we will use ideas that come from many different places. That is why you're going to meet such a great variety of people who have contributed to our collective learning.

And why we want to give you the chance to ask, "How did that knowledge get into the textbook?"

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Books

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Galileo Explaining Moon Topography to Skeptics by Jean-Leon Huens

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