Middle Level Learning 32, pp. M4–M7
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Teaching and Learning with Time Lines

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Ms. B's fifth grade class was discussing what they knew about Malcolm X prior to reading a biography of the civil rights activist—part of an on-going study of the '60s. One student asked,

"Did he know Abraham Lincoln, JFK, and Dr. Martin Luther King, Jr.?"

Quickly, the teacher sketched parallel time lines on the board, indicating that while the lives of JFK, Martin Luther King, Jr., and Malcolm X overlapped, Abraham Lincoln had died long before any of the others were born.

The students gazed with interest at the impromptu time lines until one student raised his hand,

"Yes, but **did** Malcolm X know Abraham Lincoln?"

Questions that Reveal

To the teachers present, the time lines clearly indicated the possible relationships among the biographies in question. To several students this was not obvious at all. For our group of informal teacher-researchers, this episode raised several questions. In what ways do students understand—and misunderstand—time lines? How are time lines used and taught in textbooks and history-related materials? What potential do time lines offer for helping students make sense of history?

Time lines abound in social studies and other textbooks, in biographies, and occasionally in juvenile historical fiction. Adult authors assume that time lines clarify information and events and help students develop accurate chronology and even a sense of cause and effect. But do they? Our work as teacher researchers indicates that there are often gaps between what adults assume students know and understand and how students actually make sense of, and assimilate, information.

As teachers and teacher educators, we have long believed that quality teaching demands an in-depth knowledge of student thinking, development, and learning. To be most effective in our teaching, we must plan instruction and select resources that meet students at their point of need. Teachers must be consistently aware of how students perceive information. As practitioners, we look for broad trends as well as individual idiosyncrasies in student understanding.

After observing the student responses described above in one fifth-grade classroom, we wondered if these responses were unique to this particular group of students or if they represented broader patterns of thinking among fifth- and sixth-grade students. Therefore, we designed some simple activities allowing us, as practitioner-researchers, to gather information about student conceptions and misconceptions regarding time lines. Our activities, which included student reading of time lines, interviews, and construction of time lines, were implemented in four middle grade classrooms representing the varied socioeconomic and ethnic backgrounds that comprise our community.

Understanding Student Thinking

In four fifth- and sixth-grade classrooms, we asked students to read and respond to questions about a simple time line summarizing the career of baseball legend Sammy Sosa (adapted from a DRA booklet)[1] and a complex time line illustrating the cultural and political events of an era (*The History of Us*).[2] We also asked them to create time lines that merged personal information with world events that had a clear beginning and end (discrete in time) as well as events that are ongoing. We conducted whole-class discussions and lessons, as well as small group interviews, to help us understand what and how students think.

With a few exceptions, we found that fifth and sixth grade students understood the chronology of time lines. They read left to right along the horizontal or top to bottom on the vertical axis and did not have difficulty identifying what happened first, next, before or after. Beyond these basics, however, their understanding was often incomplete or confused due to

- limited background knowledge about events and people depicted, and
- a lack of knowledge of certain graphic conventions used in time lines (see example, page 16).

Responding to a question about why the Sammy Sosa time line ended in 1999 (the year the booklet was published), a student wrote, "He was born in 1968. And he died in 1999."

In a small group interview, three fifth graders pored over a time line in *The History of Us*. This visually busy graphic shows lines arising from a drawing of actress Lucille Ball, reaching up to bracket the period from 1951 to 1957, and captioned with the words "Lucille Ball stars in television." Other events in history and popular culture are identified for the intervening years 1952, 1953, 1954, etc. The interviewer pointed out the convention and asked students how they interpreted it. The following conversation ensued.

Boy 1: She probably was born here and died here.

Girl 1: But she'd only be 6.

Girl 2: It shows the years she starred on TV: 1951 ***and*** 1957.

Girl 1: I call my neighbors Ricky and Lucy.

This interesting snippet of conversation provides several insights into student thinking. The first is the automatic assumption by Boy 1 that beginning and ending dates imply birth and death. Although Girl 1 quickly challenged this assumption (she recognizes the incongruity of the dates as a life span), Girl 2 incorrectly interpreted 1951 and 1957 as two discrete dates in which Lucille Ball starred on television. The final comment (about presumably comical neighbors) illustrates students' ongoing need to link information to their personal lives.

Layers of Information

After several small and large group sessions focused on reading time lines such as these, we gave students an assignment: create a time line that combines personal and non-personal information. The next day, students brought to class their lists of personal life events. We then paired students and asked them to create a single time line that included

- three personal events from each partner,
- three events from a list (prepared by the teacher), of discrete (or single date) national and international events, and
- one item from a list of events spanning a time period (for example, the presidency of Bill Clinton or George W. Bush, or the emergence of bird flu).

Our goal was for them to merge personal information with events from the larger world, to deal with multiple events around a single date, and to incorporate information spanning the period of their own life in appropriate ways.

The results replicated the patterns we had observed as students tried to interpret published time lines (Sidebar, page 6). Similar issues emerged: Students matched dates and events in chronological order. They tended to see time lines as a series of discrete events, and as long as the information was consistent with this format, they were successful. They were unable, however, to integrate items that deviated from basic chronology such as over-lapping or layered events spanning several years. While a few children successfully solved the various aspects of the task, many did not. Some teams could not maintain the basic chronology when partners had overlapping events, and they resorted to side-by-side entries for the same year, or completely parallel time lines. Most could not decide how to deal with a continuous event and finally placed it as a discrete entry using the beginning or ending date (Sidebar, page 6). Although our observations of these struggles were initially made in upper elementary classrooms, we later found that many high school students exhibited a similar confusion.

Time Lines and Textbooks

We extended our informal investigation by looking more deeply into the information available to teachers and students in textbooks. Graphics called time lines generally fall into two categories, identified by Steve Moline in *See What You Mean*.[3] The first is the flow time line, which represents a sequence of events with uneven spacing. Arrows indicate the direction of sequence, which may wind and twist. These are sometimes referred to as chronologies and are most commonly found in biographies and other trade books. The second type of time line, a graph, shows a time period divided into measured increments with consistent spacing. A graph depicts not only chronology, but shows visually the temporal relationships among events.

Surveying several social studies textbook series that cover grades 1 through 6, we found time lines consistently represented as graphs and introduced to students as early as the third grade, usually with a strategy lesson followed by a unit review time line and questions. Through the grades, the time lines become increasingly complex. The earliest time lines are simple horizontal graphs. Later, vertical and parallel time lines appear. Textbook demands were at a literal, concrete level, emphasizing retrieval of information rather than historical understanding. Questions posed to students focused on identifying dates (When did X happen?), identifying sequence (Which happened first? What happened before X?), and making mathematical calculations (How many years passed between X and Y?)

Time line strategy lessons appeared once in each textbook at each grade level. The strategies were referred to again in the unit review for that chapter. A time line generally appeared once more in a different chapter or context. Questions, as described above, focused students on recall and simple comprehension. Very seldom did questions lead students to make evaluations and judgments or to synthesize information. We found little evidence that lesson questions took students to higher-level thinking or used time lines as a tool for developing deeper historical understanding.

An Underutilized Resource

We think that time lines are an underutilized resource for assisting students to think deeply about historical information for several reasons. Time lines, by their nature, compact a great deal of complex information. Students at the elementary level or early middle grades do not always deal successfully with the conventions of time lines because they lack background knowledge about historical events and time line conventions. Experiences with time lines in elementary and middle schools usually do little to alleviate these problems. Textbooks often treat time lines as an end in themselves, rather than a tool for understanding. Thoughtful teaching can, however, change that.

In developing a vision for working with time lines in history, we do not want to discount the value of chronology and sequencing. It can be helpful to have a simple graphic showing at a glance which events happened concurrently (or earlier or later) in a time period. Cause and

Sidebar: **Commentary on Student Work Samples**

Figure 1: Above. A pair of fifth-grade students struggled with chronology as indicated by the placement of *The Titanic* movie (which was first released in 1997) after the personal information about playing games. There is no indication of why the date of 3/37/98 (an impossible date) is associated for this student with playing games.

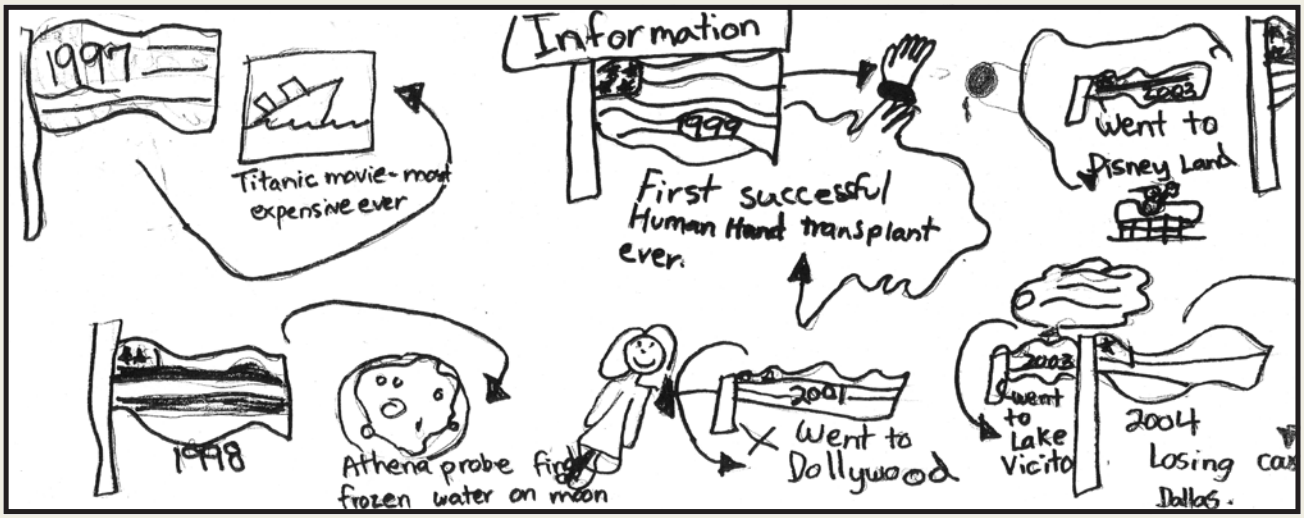

Figure 2: Above. Two fifth-grade girls were able to put their personal information in chronological order and did appropriately integrate information from the broader world (*The Titanic* movie/Athena moon probe), but could not solve the problem of merging two sets of information. They resorted to roughly parallel time lines with one student's information at the top and the second student's information at the bottom.

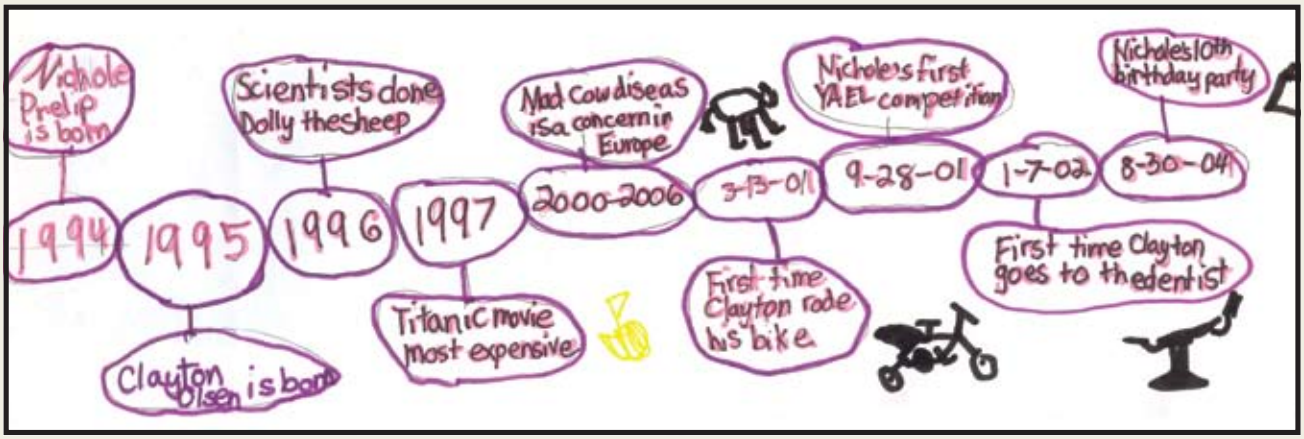

Figure 3: Above. This fifth-grade partnership of academically successful students planned their work carefully, spending time creating a rough draft before committing their final time line to paper. They were successful in merging two sets of personal information along with national and world events. The exception is the continuous event (concern over "mad cow disease"), which they showed as a single point on the time line at the correct location for the beginning date.

effect, or the influence of one event on another, can be suggested, but not established, by the time line.[4]

Many problems in student understanding arise because time lines represent someone else's summary of complex events. To students, timelines appear to be established and unchanging. Without guidance, students do not understand that a time line is created by a person with a point of view about the information, someone who has made choices about what will be included, and what will be left out. Further, textbook lesson plans usually offer little to engage students or provoke thinking, confining questions to mathematical calculations and sequence.

Questioning the Time Line

The time line can be a tool for developing understanding if it is approached in a constructivist manner. Teachers support student understanding in a variety of ways, including modeling and mediating different types of time lines and leading students to discuss the meaning and usefulness of various graphic conventions. Multiple time lines, ranging from broad overviews to focused information, can accompany any unit of historical study. We suggest that teachers regularly engage students in higher level thinking around varied time lines by using a protocol which we call "Questioning the Time Line." The goal of working with a time line is to help students internalize some of the thinking involved in its creation. The protocol consists of a series of short, but thought-provoking, questions:

- What purpose does this time line serve? How does it help you understand this time in history?
- What events did the author select for the time line? What other events could have been included?
- Why did the author select these particular beginning and ending points for the time line?

Let students know that there are no clear, black and white answers to these questions. Students and teachers must certainly speculate as they develop answers. That process, however, forces students to consider the thinking behind the creation of any given time line and to view it as a product of deliberate choice.

Students gain facility in using this questioning process by beginning with simpler time lines (life of a president, for example) and moving to more complex ones (history of the Civil Rights Movement). Time lines are demystified as students grow in their ability to think about creation of a time line. In her book *Reading History*, Janet Allen describes the process of having middle school students compare and contrast multiple time lines to identify commonalities and to generate questions.[5]

Understanding grows by doing. Linda Levstik and Keith Barton, in *Doing History*, suggest that students should be engaged in developing time lines by deciding what should be included (an activity that involves judgment and evaluation). We concur that students need to be engaged in creating a variety of time lines throughout their school careers. Students must go beyond the "personal lifeline" to integrate larger local, state, national, and international events, which emphasizes that they are part of the larger world.

The period examined should also increase: students may begin with personal life spans, but then extend backwards to include their parents' and grand-parents' life spans. At every step, students can be engaged in deciding on appropriate beginning and ending points, which events are worthy of inclusion and why, how those events relate to one another, and how those relationships can be shown.

Students must also experiment with layering information. A time line covering several hundred years may be a permanent classroom visual. However, students will create time lines that focus on a specific topic such as prominent people, civil rights, women's suffrage, or the Civil War. They must then decide how to condense the in-depth time line within the larger, broader classroom visual, dealing with issues such as what information best represents the period and how to fit it into the larger picture.

Creating time lines around important topics and considering how to combine various time lines forces students to prioritize and summarize information. It is an activity requiring in-depth study and judgment. It teaches students to become critical consumers of time lines prepared by others, as well as creators of their own historical understanding.

Notes

1. J. Beaver, *Developmental Reading Assessment (K-3): Sammy Sosa* (New York: Celebration Press, 2003), 1.
2. Joy Hakim, *The History of Us: All the People* (New York: Oxford University Press, 2003), endpapers.
3. Steve Moline, *I See What You Mean: Children at Work with Visual Literacy* (Portland, ME: Stenhouse, 1998).
4. A classic demonstration that sequence (or correlation) does not always reveal causation was done with a graph showing that the number of murders per month in a city rose and fell in parallel with sales of ice cream. Does ice cream cause murder? No, there is a third force that is likely driving the other two variables: summer heat.
5. Janet Allen with Christine Landaker, *Reading History: A Practical Guide to Improving Literacy* (New York: Oxford University Press, 2005).
6. Linda S. Levstik and Keith C. Barton, *Doing History: Investigating with Children in Elementary and Middle Schools* (Mahwah, NJ: Lawrence Erlbaum, 2001).

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