

Reading Objects

Children Interpreting Material Culture

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Objects, their patterns, and their context(s) of recovery represent the material manifestations of human behavior. Objects provide a way to investigate change and continuity in the human experience. Through objects, we can learn about peoples who lived millennia ago or who lacked written language. Objects provide an authentic voice for groups poorly represented in the historical record, such as the enslaved, minorities, and women. In each of these cases, we

must infer human behavior and ideas from the material remains of what human beings have made and used. . . . The interpretation . . . depends upon an understanding of how human beings behave . . . and particularly [of] how this behavior is reflected in material culture [Trigger 1989:19].

This materiality of human behavior and ideas means that objects, whole or fragmentary, can become powerful educational tools. History and archaeology educators have long emphasized archaeology's power to motivate student interest (Bage 2000; Wearing 2011; Williams 2000) and student inquiry (Brody et al. 2014; Davis 2005; Levstik and Henderson 2015; Levstik et al. 2014; Moe 2011). Not only does such inquiry offer insights into archaeological processes (deposition,

ABSTRACT

Object-based, experiential learning/evidence-based inquiry engages young minds and models how research is conducted. It is clear that this kind of authentic experience stays with students long afterward. Our research investigated 74 fifth-grade public school students' conceptions of evidence, of the provisional nature of archaeological and historical interpretations, and of the purposes for using archaeology to study the past. Three and four years later, we conducted follow-up interviews with 29 of the students to investigate what they remembered about their archaeological experience, including classroom instruction, excavation/labwork, and concepts related to archaeological processes and historical information. Our study shows that in-depth archaeological study has considerable sticking power. It also provides important insights into how students think about archaeology, history, and the past, and how they relate "things" to the past and to past cultures. In particular, it shows that the materiality of archaeology offers students opportunities to create multiple, evidence-based interpretations when they are taught to understand culture in material ways. Our study also offers concrete suggestions for anyone considering using objects to teach about the past: use an inquiry-based approach, take students' prior knowledge into account, use metaphors carefully with younger children, and make the human-object connection explicit for all.

El aprendizaje por indagación basado en la evidencia, el aprendizaje vivencial y los objetos replica los procesos reales de investigación que involucran a las mentes jóvenes. Es evidente que este tipo de experiencia auténtica se mantiene con los estudiantes mucho después de haber terminado. Nuestra investigación estudió las concepciones que tienen 74 estudiantes del 5º grado en escuelas públicas sobre la violencia, la naturaleza temporal de las interpretaciones históricas y arqueológicas y el propósito de usar la arqueología al estudiar el pasado. Después de tres y cuatro años realizamos una serie de entrevistas de seguimiento con 29 de los estudiantes para investigar lo que recordaban de su experiencia con la arqueología, incluyendo las instrucciones en el salón de clases, las excavaciones y el trabajo en el laboratorio y los conceptos relacionados con los procesos arqueológicos y la información histórica. Nuestro estudio demuestra que las investigaciones arqueológicas a fondo tienen un poder de retención en los estudiantes considerable. De la misma manera provee percepciones importantes sobre cómo los estudiantes consideran a la arqueología, la historia y el pasado, también como se relacionan con "cosas" del pasado y de las culturas del pasado. En lo particular, demuestra que la materialidad de la arqueología ofrece a los estudiantes oportunidades para crear múltiples interpretaciones basadas en evidencia cuando se les enseña a entender a la cultura en formas tangibles. Nuestro estudio también ofrece sugerencias concretas para cualquiera que considere usar objetos para enseñar sobre el pasado: usen una aproximación basada en la indagación, tomen en cuenta el conocimiento previo de los estudiantes, usen metáforas con cuidado con los niños más jóvenes y hagan la conexión entre el humano y los objetos explícitas con los estudiantes de todas las edades.

disturbances, and the like), as well as the processes involved in doing archaeology (hypothesis development, excavation/the collection of evidence, analysis, interpretation), it can enhance the humanistic study of the past by emphasizing:

- that human experience has great time depth;
- that over this long span of time, humans developed and continue to develop complex systems of beliefs, goals, values, and behavior;
- that these cultural patterns are not inevitable nor equally shared by all members of a culture, but change over time;
- that because material culture shapes and is shaped by human activity and agency, material remains—artifacts—not only illuminate human behavior but suggest alternatives to current patterns; and
- that archaeological interpretations provide evidence-based, tentative, and perspectival descriptions of human/material interactions that can inform citizens' decisions about what cultural patterns and practices to keep, alter, or discard.

Given this kind of focus, archaeology, with its unique approach to investigating and interpreting material culture, assumes a more significant—and exciting—role in teaching and learning. Rather than being sidelined to “enrichment” or “gifted” programs, or seen as peripheral to social studies and history curricula, archaeology becomes fundamental to historical study—a crucial approach to helping students understand the full scope of human experience, providing material evidence of human agency, as well as of the materiality of human behavior over the entire span of human existence.

Realizing this potential can be challenging. Drawing on an earlier study investigating ways in which archaeology contributes to elementary school students' historical thinking (Henderson and Levstik 2004; Levstik et al. 2003, 2005, 2008), and its 2005/2006 follow-up (Henderson and Levstik 2008, 2010), here we consider how students perceive “things” (objects, artifacts), how they relate “things” to the past and to past cultures (Hodder 2012), and how educators might use material culture to help students of all ages better understand the depth and diversity of human experience. We also assess how durable the students' learning experience was over time.

RESEARCH PARAMETERS

Initial Study

Practical concerns provided the impetus for our earlier study: the need to determine the effectiveness of the [Kentucky Archaeological Survey's \(KAS\)](#) educational programming involving schoolchildren.¹ As has been the case elsewhere in the United States (Cressey et al. 2003; Heath 1997; Jeppson and Brauer 2003; White and Williams 1994), KAS had collected considerable anecdotal testimony regarding the success of its programming prior to our study (Kentucky Archaeological Survey 1998, 2001, 2002, 2003). But, because KAS staff had never directly investi-

gated student learning, they had no idea what “success” meant. They were in no position to improve instruction or to assess it, largely because they had not fully considered the curricular purposes or learning outcomes toward which instruction might be aimed.

At that time, KAS projects for schoolchildren involved mainly interfacing with public school teachers and their upper elementary school students studying archaeology, Native American cultures, or ancient civilizations. KAS staff functioned as content specialists, visiting classrooms to talk about archaeology or Kentucky's ancient to recent history. They might lead students in hands-on activities with artifacts, but KAS knew little about these units' curricular context or teachers' learning goals and did not partner with teachers to develop units—with the notable exception of the [Building Blocks of History](#) program, a collaboration between KAS and educators and staff at Riverside, the Farnsley-Moremen Landing, which began in 1998 (Henderson 2014; Kentucky Archaeological Survey 1999, 2004b; Stahlgren and Stottman 2007).

When teachers and students participated in KAS field projects, activities focused mainly on introducing students to the tools and the processes of archaeology as they excavated at real sites (under close supervision!) and washed and sorted real artifacts, and on learning about issues surrounding site preservation (Kentucky Archaeological Survey 1998, 2002, 2003). Because these experiences were about “doing” archaeology, students were only minimally informed about the historical context within which they worked, or the research questions guiding the work. Similarly, KAS staff did not often talk about what archaeologists *did* with their data once they got it.

At the time of our study, KAS had been involved in archaeology educational programming for seven years. Beyond teaching students how archaeologists excavate, KAS staff believed that archaeology could serve as a vehicle for learning about a host of topics, but the staff's lack of familiarity with educational concepts and tools was a problem. The research results described here as well as in subsequent studies (Henderson and Levstik 2004; Levstik and Henderson 2015; Levstik et al. 2008; Levstik et al. 2014) began the process at KAS of reconceptualizing archaeology in an educational context, reflecting on the organization's educational goals, and revamping how it would carry out its education mission (Henderson 2014). We will return to this in the conclusions.

For our 2002 assessment project, we wanted to study a best-case scenario. That meant finding a representative group of students participating in a standard KAS educational program: upper-grade elementary, urban/suburban public school students of all academic levels, most of whom did not receive services for special needs, who were experiencing an in-depth introduction to archaeology for the first time. We needed a teacher experienced in teaching archaeology, familiar with KAS-vetted curriculum materials, and willing to have researchers in the classroom. We sought a setting where archaeology was a regular element of the curriculum, rather than extracurricular, and where students actively engaged in archaeological study to make sense of objects as evidence of past human activity.



FIGURE 1. Students excavate within the possible slave quarters area at Ashland, the Henry Clay Estate, in 2002.

Participants and Settings. Sylvan Elementary School² met these criteria. Ms. Jennie Schlarb, a fifth-grade teacher, had spent three years developing and refining an *Archaeology Exploratory*, an intensive unit on archaeology. Furthermore, for our initial study, all but four of Sylvan Elementary School's 78 fifth graders (40 boys and 38 girls) agreed to participate.³

Three sites formed the backdrop for Ms. Schlarb's *Archaeology Exploratory*. Sylvan Elementary School, located in a middle-class neighborhood in a midsize city in the upper South, enrolled 607 students from kindergarten through fifth grade: 77.3 percent "White," 15.0 percent "Black," .5 percent "Hispanic," 1.0 percent "Asian and Pacific Islander," and 6.3 percent "Other," with 32.0 percent enrolled for free or reduced-price lunches. Students from the three fifth-grade classrooms attended the *Archaeology Exploratory* four days a week for 45 minutes a day, from January through the end of the school year in May.

[Ashland, the Henry Clay Estate](#), was a nearly perfect setting for a daylong, immersive, archaeological field and lab experience in which students could put into practice skills learned in the classroom (Figure 1). The only active KAS excavation in mid-April near the school, Ashland was easily accessible by school buses, and its rich archaeological deposits had already produced an artifact assemblage of thousands of nineteenth-century objects.

Beginning in 1990, archaeological research at Ashland had explored the architectural history of the main building and collected information from across the site about the lifeways of the plantation's former inhabitants, including those enslaved there (Kentucky Archaeological Survey 2001, 2004; McBride 1993;

McBride and Esarey 1995; McBride and McBride 2008; McBride and McBride 1991; O'Malley et al. 1999) (Figure 2). Archaeologists discovered an unusual plantation layout at Ashland, compared to typical Southern plantations (McBride and McBride 2008). Two privies produced enormous assemblages of ceramics and a wide range of specialized serving vessels typical of large dinners, social events, and very formalized dining. Work at the site initiated in 2000 included the education of school-aged children as a formal component.⁴ When students visited in mid-April, archaeologists were excavating south and east of the main house, where shovel probes had encountered possible remnants of slave quarters, which had been mentioned in the 1860 slave census.

Following the site visit to Ashland, students also spent a half day in early May at the nearby university's small anthropology museum featuring exhibits about Kentucky's Native past and other archaeological topics covered in their classroom activities.

Curricular Context. Archaeology is among several disciplines (anthropology, economics, geography, history, and psychology) within the scope of "Social Studies," a major content area evaluated in fifth grade in Kentucky (Kentucky Department of Education 2006). The *Archaeology Exploratory* targeted core content addressed in that assessment, including Native American cultures. Ms. Schlarb preferred a hands-on approach. The use of objects (as primary sources) supported and deepened her students' understanding of different cultures and highlighted the contrast between primary and secondary sources. While the trip to the anthropology museum did focus on some aspects of Native American culture, classroom instruction and the Ashland



FIGURE 2. The old privy vault, discovered during archaeological research at Ashland in 2002.

field trip emphasized the processes of archaeology and objects as primary sources.

It is important to note that the purposeful study of the process of archaeology is not presented in the fifth-grade Program of Studies, although concepts such as observation and inference, classification, development of hypotheses, and evidence are embedded throughout the social studies curriculum, as well as in science and math. More problematically, the content archaeological research generates may be represented in the study of ancient cultures, but the link between process and content is rarely made. Thus, despite the fact that archaeology is inquiry based and that so many of archaeology's fundamental concepts are basic concepts teachers are required to teach, and that the information archaeological research generates is the content teachers *do* teach, archaeology rarely appears in the school curriculum as a critical tool for learning.

Ms. Schlarb's *Exploratory* combined lessons that she had developed with ones from Project Archaeology's *Intrigue of the Past*, a national curriculum for grades four through seven (Smith et al. 1996; see Moe 2016). First, students brainstormed what they already knew and wanted to know about archaeology using a KWL Chart, which tracks what a student knows (K), wants to know (W), and has learned (L) about a subject. Then they learned about the importance of the past and artifacts. They learned archaeological terminology, fundamental concepts—observation and inference, context, classification, stratigraphy—and the technique of gridding a site using Cartesian coordinates. To model the concepts of stratigraphy and context, Ms. Schlarb

created a diorama filled with different colored sand layers containing artifacts (students did not “excavate”). Writing, in the form of essays, was included, and the unit also introduced students to stewardship/archaeological ethics issues and the importance of protecting sites.

To fulfill student teaching course assignments, Ms. Schlarb's student teacher for the 2001–2002 school year designed and implemented lessons linked to the *Exploratory*. These challenged students to categorize types of artifacts and to distinguish between artifacts and non-artifacts. Students also read excerpts from *Kentuckians Before Boone* (Henderson 1992), a short book about Kentucky's prehistoric farming peoples, and then were asked, based on their reading, to contrast the natural resources available to past Native peoples with those available today and past Native clothing with that of today.

Class visits from KAS archaeologists introduced students to Kentucky's diverse prehistoric cultures and prepared them for their to Ashland visit by showing them tools used in fieldwork and slides of archaeologists engaged in fieldwork. They led students in an artifact analysis activity using historic period artifacts.

At the midpoint of the unit, Ms. Schlarb used a written survey to assess student learning. Later, before the students' Ashland visit, they participated in an assessment organized around 12 learning centers.⁵ These targeted vocabulary building, artifact sorting, making observations and inferences, reconstructing broken objects, and writing persuasive essays related to local site preservation.

When the students visited Ashland, they were divided into rotating work groups after viewing a short slide presentation that introduced them to the site and to the fieldwork. While one group toured Henry Clay's restored home guided by a docent who provided historical background on Clay, a second group worked under the guidance of KAS archaeologists at several excavation units in the possible slave quarters locale, and a third group, also supervised by KAS archaeologists, worked under a canvas tent washing and sorting artifacts. As each house tour concluded, the groups rotated.

Tasks in the field involved using trowels to uncover artifacts, screening soil for artifacts and placing them into labeled bags, washing historic-period artifacts (i.e., ceramics, glass, nails, coal, metal objects), and carefully sorting them into categories. At the end of the day, students gathered on the lawn for further interpretive discussion. We asked the students to comment on what most surprised them about the day; what questions they had, based on their experience; and what objects were the most difficult to interpret. We also engaged students in some interpretation, asking them to think about how the objects they had seen in the house and found during excavation told them about people's lives on the plantation.

The half-day visit to the museum exposed students to the kinds of interpretive work that follows excavation, artifact retrieval, and analysis. KAS staff led the students in an activity focused on discovering the diverse lifeways of Kentucky's ancient Native Americans by interpreting artifacts displayed in the cases.

Data Collection and Analysis. To assess what students were learning, we collected data from multiple sources over the course of their five-month archaeological study: field notebooks, regular written and oral status reports on student work, and artifact analysis worksheets. We audio- and videotaped classwork and videotaped all activities in the field, including informal discussions between students and archaeologists.⁶ Most of these focused on archaeological processes. But we also asked students to consider what artifacts indicated about people's lives or why some things remained (china, metal, and the like) while others left few traces (cloth, leather, foodstuffs).

At the conclusion of the unit in mid-May, we interviewed 72 of the 74 study participants, usually in groups of three (see Appendix 1 for interview protocols).⁷ Interview questions were designed to explore students' learning with respect to the major concepts they had studied, and their understanding of the working patterns of archaeologists, the purposes behind archaeological research, and the possibilities and limitations of archaeological interpretation. We asked students to evaluate a picture of stratigraphy that showed evidence of looting (see Figure 4 in the appendices), to sort a group of artifacts that consisted of examples of prehistoric and historic objects, and to consider a hypothetical stewardship situation.

Each of our data sets were analyzed separately and coded for evidence of conceptions and misconceptions related to students' archaeological and historical thinking. Using a constant comparison analysis, an iterative and inductive process during which data are coded within and across data sets, we searched for confirming or disconfirming evidence to establish a set of core categories we would use in interpreting

student interviews (Charmaz 2006; Stake 1995; Yin 2003). Many of the initial categories were broken down, combined, or added to during this process. This resulted in the descriptive generalizations that form the basis for the interpretations that follow (cf. Levstik et al. 2003, 2005).

Follow-Up Study

In 2005 and 2006, three to four years after the initial study, we conducted a follow-up investigation with the former fifth-graders from Sylvan Elementary School (Henderson and Levstik 2008). We were curious about the residual impact of their archaeological study: What concepts (if any) turned out to be reasonably robust? What intervening experiences (if any) supported, distorted, or refined students' earlier conceptions of the interpretive value of material objects in understanding past lives?

Participants. Tracking down the original 74 students across grade levels and many different district schools was a challenge. In 2005, 50 were still enrolled in the school system. Only 29 students—17 eighth graders (7 boys and 10 girls) and 12 ninth graders (5 boys and 7 girls) (39.2 percent of the original 74 participants; 58.0 percent of the enrolled students)—agreed to participate.⁸ These figures mean that our findings remain suggestive of areas for further investigation rather than conclusive regarding the staying power of archaeological study.

Curricular Context. In the sixth, seventh, and eighth grades, Kentucky students are indirectly exposed to content generated by archaeological research, including "Old World" (Egypt, Rome, Greece) and "New World" (Maya, Inka) cultures. However, this curriculum does not directly address the analytical or methodological processes of archaeology and material culture study, nor does it consider how, through these processes, historical facts are generated.

Data Collection and Analysis. We collected our follow-up data exclusively from semi-structured, 50-minute audiotaped interviews with the students in groups of two to four. Our intent was to replicate the interviews from our initial study and explore what knowledge the students retained about the major concepts they had studied in fifth grade. Although we did not ask them to sort artifacts as they had in the previous interview, we did present them with the same stratigraphy picture and the same stewardship situations. We added a set of questions designed to explore what the students remembered of their fifth-grade experience and what opportunities they may have had to apply their knowledge since that experience (Appendix 2).

We used the same coding system and analytical techniques as in the initial study. We also compared the results with data from that study to complete the descriptive generalizations.

RESEARCH RESULTS

Initial Study

Hands-on, object-based activities certainly engaged the fifth-graders' interest. Overwhelmingly, they reported loving the experience of holding "something that someone from maybe a thousand years ago was holding" and often described discover-

ing pieces of the past as personally motivating. Students enjoyed the element of mystery or puzzlement, reveled in sorting and washing artifacts, and enthusiastically engaged in speculating about the lifeways of past people.

Some things proved confusing. Students who excavated a length of metal in their unit thought it might be part of the Underground Railroad. They were surprised to learn that “underground” and “railroad” were metaphorical rather than literal. And, in any case, there is no Underground Railroad connection at Ashland.

So why did the students offer up this interpretation? Drawing on their knowledge and previous instruction, they made a series of inferences. They knew about slavery and Harriet Tubman. They were working in an area that they had been told was the potential location of the slave quarters, ergo, metal under the ground in a slave quarters area is part of the “Underground Railroad!” What is particularly compelling in this regard, however, is how quickly students corrected themselves.

As student confusion about the Underground Railroad suggests, students may “catch” some important concepts simply by engaging in archaeology and the study of material remains, but they are likely to miss other concepts without *purposeful practice* in “reading” artifacts (Barton and Levstik 2004; Levstik et al. 2008, 2014). In this case, *purposeful practice* refers to instruction aimed at subject-specific goals, including understanding behavior as human/material interaction, and identifying patterns in the interactions between humans and objects. It is also instruction aimed at humanistic goals—broadening conceptions of what it means to be human and thereby dealing intelligently with variety and change. We expect that when educators intentionally teach toward these goals, explicitly addressing the kinds of questions that frame archaeological work, students will make better use of objects/artifacts in interpreting past lifeways, especially in regard to people for whom artifacts are really the only extant record.

Understanding Objects as Evidence: A Challenge for Students. Our investigations suggest that understanding objects-as-evidence can be challenging for students.⁹ The Sylvan students distinguished between “just thinking, just making inferences about” the past—the processes they described as characteristic of historians—and the active work of archaeologists. To them, archaeology involved “inquiry” or “study,” about “the past,” “humans or people,” and “culture.” Invariably, students defined culture as how people in the past “did things,” often emphasizing folkways related to the customs, foods, and costumes approach found in many elementary schools.

They were a bit less sure about how artifacts related to culture. Some understood artifacts as evidence of production, explaining that the objects left by long-gone people demonstrate their use of natural resources. Interestingly, students rarely identified what resources might have been used in the production of artifacts. Indeed, they were surprisingly uninformed about the makeup of common items. When they discussed artifacts as elements of behavior, students described how humans used artifacts to solve problems, meet needs, or participate in cultural activities, but they did not discuss the ways in which tools shape



FIGURE 3. Artifacts—whole or fragmentary—like these recovered from Ashland’s privy, serve as rich teaching tools. However, students often do not recognize what artifacts are made of or the technology of their manufacture.

human activity, nor did they have a solid grasp of the technologies required to produce artifacts. In this context, “technologies” means the basics of how clothing or glass bottles or bricks are made, what kinds of knowledge goes into making them, and what kinds of materials are used and why (Figure 3).

Students’ definitions also attended little to such distinctive features of archaeology as materiality or context, or to the connections between these features and evidence-based interpretations. “Found objects” of any sort—rocks, fossils, pottery sherds, animal bones, human bones—fascinated them, but they did not necessarily describe them as evidence of past human activity, culture, or historical patterns.

Given that fifth grade is generally students’ first experience with the formal study of history (much less of archaeology), these findings should not be surprising. In fact, of the groups including artifacts in their definition of archaeology, only two explicitly connected artifacts and culture, and none identified artifacts as evidence of patterns in human behavior or experience. Nonetheless, their struggle to make these links leaves students at some disadvantage in imagining the choices available to different people at different moments in time and in understanding the difficulties involved in reconstructing the context wherein those choices were made—basic features of historical understanding.

How Artifacts Tell Students (or Confuse Them) about the Past. Students constructed explanations that included attention to artifacts as objects—most often tools—made and used by humans and dug up by archaeologists in order to tell people in the present about the past. In their efforts to explain this process, they resorted to metaphors that described artifacts as puzzle pieces, clues in a mystery, and elements embedded in a context. Moreover, when asked to explain what “story” a group of artifacts might tell, students tended to create interpretations that relied more heavily on familiar narrative structures—problem, climax, resolution—than archaeological evidence, often abandoning evidence in favor of maintaining a story line, a pat-

tern that appears in other studies of historical thinking (Levstik and Smith 1996; VanSledright 2002). Overall, their use of metaphors indicated that they were making reasonable connections among artifacts, contexts, and human behavior.

The students most commonly described artifacts as puzzle pieces that could, eventually, tell a single “whole story.” In four of the 20 fifth-grade interview groups, for instance, students referred to piecing together the past—literally, as when Fred explained that archaeologists “look for missing pieces, and the pieces that they find, they have to put together,” and more metaphorically, as when Millie said that the whole process is “like a puzzle.”

From this perspective, archaeologists search out artifacts—the puzzle pieces—in order to tell “the whole story” of the past. The end product of archaeological work, then, is a story. Although story and puzzle metaphors help students understand the partial and ambiguous nature of archaeological interpretations by explaining how careful observation of artifacts leads to better inferences and a more complete interpretation of past behavior, they more problematically imply that a single correct story is not only possible, but a desired outcome of historical and archaeological inquiry. They really did not connect these stories, puzzles, or mysteries very closely to their other ideas about culture, in part because their ideas about culture were not very robust.

During the *Archaeology Exploratory*, only very occasional references were made to artifacts as evidence (Levstik et al. 2008), and no chain of activities in the classroom, at the excavation, or at the museum explicitly addressed what artifacts might be evidence of. Perhaps not surprisingly, then, students never used the word *evidence* in relation to artifacts. Some did, however, compare archaeologists’ use of artifacts to crime-solving forensics as depicted on a familiar television program. This analogy suggests some understanding on their part of the evidentiary potential of artifacts.

The fifth-graders’ discussions while sorting and analyzing collections of artifacts provides further evidence of their understanding of the speculative nature of archaeological investigation. Qualifying words appeared regularly in their descriptions: *maybe, sort of, I guess, we don’t know, somehow, could have been*. Speculation appeared in each of the fifth-grade interview groups and was a regular feature of class discussions and fieldwork. Students interpret, offer alternative possibilities, and call background knowledge into play as they speculate. Their willingness to consider different interpretations and the ease with which they responded to interviewers’ questions suggests, too, that it might not take much teacher mediation to move students beyond the search for a single story to imagining different perspectives and possibilities based on the same material evidence (see, for instance, Levstik et al. 2014).

One of the challenges of working with artifacts in the classroom is that students so often observe them out of context. This is one of the reasons the field experience is so important. Considerable classroom instructional time focused on the importance of context. In interviews, the fifth graders mentioned that moving artifacts “messes up” or “ruins” the “whole story.” An array of artifacts in context told the “real story” rather

than leaving archaeologists and historians to make “educated guesses.” Students still struggled, however, to explain the role context plays in more firmly establishing an artifact’s meaning while still allowing multiple interpretations of the lifeways surrounding its use.

Despite their testimony to the importance of context, when asked about how they might interpret a decontextualized array of artifacts, all students thought a reasonable story could still be constructed using the artifacts alone. Again, this shouldn’t be surprising. Most of their experience with artifacts prior to their fieldwork involved artifacts out of context. Even in the museum, artifacts took center stage with contextual information largely confined to text and illustrations.

It is impressive then, that there was much about context that students understood quite well. All students connected context with an archaeological site and most described the importance of stratigraphy in interpreting a site. One student, pointing toward the room around him, declared, “Books! Shelves! Context is what helps you know that this is a library.”

Follow-Up Study

The most telling result of our follow-up study was that student enthusiasm had not waned since their fifth-grade archaeology experience. They recalled the excitement of the field trip, but also the excitement of investigation. Almost all recalled enjoying finding other people’s material culture and speculating about the lifeways of past people.

Understanding Objects as Evidence: A Challenge for Students.

Three years after our initial interviews, students defined “archaeology” much as they had when in fifth grade. In addition, they now described artifacts as elements of historical as well as archaeological inquiry and saw them as evidence of culture, which they still defined as “how people did things.” They referenced technology as being related to material culture and how people made and used material objects, and they emphasized artifact analysis as a defining feature of archaeology. In fact, their ideas about technology and artifact analysis appeared to have matured even without specific archaeological study.

Just as had been the case in fifth grade, however, the eighth and ninth graders showed little evidence of understanding that some cultures can be known only through archaeology. Overall, culture continued to be a challenging concept. The term appears to serve more as a catch-all phrase than as a tool for making more specific sense of pattern and connection within and between groups of people. Thus, telling students that the analysis of artifacts involves studying past cultures tells them little. If they understand culture in largely nonmaterial ways, students cannot help but be confused about how material objects serve as primary sources for making sense of past cultures.

How Artifacts Tell Students (or Confuse Them) about the Past.

Unlike the fifth graders, the eighth and ninth graders did not employ “puzzle,” “story,” or “mystery” metaphors to explain the evidentiary uses of artifacts. Instead, they described a fairly complicated analytical process somewhat reflective of the scientific method introduced in their science classes but

rife with interpretive challenges. First, fragmented evidence—objects “stuck together or broken” and “mixed up”—frustrated interpretation. Second, artifacts were, inevitably, a transformed and distorted reflection of human behavior (LaMotta and Schiffer 2001). It was not possible to gather all relevant data—some things rotted away or were carried away; people weren’t always consistent in how they used things; and meanings could change over time. As a result, detection and speculation were still seen as part of archaeological inquiry, even though students no longer described the process as akin to solving forensic mysteries.

At the same time, there was little evidence that students better understood that artifacts might represent multiple perspectives and support multiple interpretations (stories rather than story, to return to the fifth graders’ metaphor). As they did in fifth grade, too, these students insisted that a decontextualized array of artifacts could yield some information about the past. They continued to explain that context helped make better, though still not complete, sense of artifacts. The major difference lay in their willingness to consider the complications of interpretation.

We find these similarities and differences intriguing, especially given the dearth of further archaeological or historical inquiry reported by the students. However, considerably more research is required to uncover the concepts that have replaced old metaphors and to consider the impact on students’ historical thinking of these newer insights into the evidentiary nature of objects as artifacts.

HOW DO STUDENTS MAKE SENSE OF THE MATERIAL WORLD?

As expected, given previous reports, archaeological activity interested and excited the students with whom we worked (McManamon 1991; McNutt 2000; Rogge and Bell 1989; Selig 1991; Smardz and Smith 2000). Irrespective of age, they approached artifact interpretation with considerable enthusiasm. Further, from students’ responses as eighth and ninth graders, in-depth archaeological study clearly has considerable sticking power. They understand that the material remains of the past help answer archaeological questions, that those remains are partial, and that, given more artifacts in less disturbed sites, archaeologists can construct more complete accounts of past cultures. Students of all ages view archaeology as an open-ended, ongoing inquiry. They recognize that careful observation of artifacts leads to better inferences and more complete interpretations.

Because of its materiality, archaeology would appear to offer students concrete opportunities to create multiple, evidence-based interpretations. We find little evidence, however, that the younger students in our study understood that an archaeological story represents one among several possible, plausible, evidence-based interpretations. It is unclear whether they continue this pattern in later years, as the older students we interviewed were no longer involved in using artifacts as primary sources for historical interpretation.

For younger students, we suspect that equating “story” with “interpretation” creates considerable confusion. The unintended consequence is to support misconceptions about the nature of archaeological and historical interpretations. Similarly, while piecing together a puzzle captures some features of archaeological work, this metaphor works best at the artifact level. This suggests that building evidence-based interpretations requires more than a change in metaphor. It requires specific instructional attention to perspective, among other things (see Barton 2008; Barton and Levstik 2004; VanSledright 2002).

While existing research is more suggestive than definitive in this regard, it is clear that students as young as fifth grade recognize multiple perspectives and the possibility that multiple interpretations might result from these perspectives (Barton and Levstik 2004). However, the *Exploratory* focused little attention on this. Students sampled processes with relatively little occasion to consider the ways in which artifacts might lead to interpretation, or the uses to which interpretation might be put. Students engaged in some interpretive tasks and visited the anthropology museum to see interpretive displays based on anthropological and archaeological data. These activities did not, however, all link one with the next. While classwork used historic artifacts related to the same time period as Ashland and students recovered historic artifacts during fieldwork, the museum displays focused on interpretations of prehistoric objects related to indigenous people. As a result, students never saw well-developed interpretations about Ashland that were direct outgrowths of the processes they observed and activities in which they participated. In consequence, they struggled with the connections between processes and interpretations. Further, these students came to their archaeological work lacking both content knowledge and sufficient experience with inquiry to support their attempts to build evidence-based interpretations.

In their first experience with archaeological study, the fifth-grade students struggled with how material culture is linked to human behavior. The older students’ understanding of the link between behavior and objects was not much better, and there is no reason to expect that it would be. They reported no further experience with interpreting behavior/object links.

Again, these results are not surprising. During their study, students did not engage in the full range of archaeological activity, especially in regard to interpretation. This need not preclude student engagement in interpretive work. With sufficient planning, students might more systematically approach question setting, data collection and analysis, and interpretation, and, as a result, come away from their artifact experience with a deeper evidence-based understanding of human/material interactions.

PRACTICAL IMPLICATIONS FOR TEACHING

We gained many specific insights relevant to classroom practice from our research (Henderson and Levstik 2008; Levstik et al. 2008). Below we discuss what we consider the most relevant.

Use Archaeology as an Analytical Lens for Learning

The insights gained from this and subsequent studies (Levstik and Henderson 2015; Levstik et al. 2014) have changed how KAS conceptualizes and approaches its educational programming. From a focus on process, on archaeology for archaeology's sake, on teaching participants how to do archaeology, and on the overt message of archaeological site stewardship, the Survey's educational programs now commonly use archaeology as a way to explore questions about long-ago people or historical and humanities issues. Archaeology serves as an analytical lens for content exploration and inquiry-based learning, and the Survey's site stewardship message is presented within this context. We feel that this approach provides students a richer learning experience

Take Prior Knowledge into Account

Students do not come to their first formal study of material culture as blank slates. They have prior notions and fragmentary knowledge about it. Sometimes prior notions are reasonably accurate. Sometimes they are dead wrong—the fifth graders' erroneous idea that the Underground Railroad was literally underground, for instance. Teachers who, before instruction, devise ways to uncover what students already think they know about objects and their meanings can better support student learning. Some misunderstandings, however, surface only in the midst of instruction and, even then, are more quickly recognized in active classes where students have opportunities to discuss what they are learning. The Underground Railroad misunderstanding became crystal clear in the midst of the excavation activity and alerted the teacher to an instructional opportunity. A teacher adept at “kid-watching” uses these opportunities to engage in corrective action by holding a discussion about other possible explanations and challenging students to use other resources to test their hypotheses.

Use Metaphors Carefully

As a fundamental tool for communication, metaphors are useful and powerful teaching tools. They clarify, illustrate, and explain things that might otherwise be outside the listener's personal experience. However, they can obscure just as effectively as they illuminate. Although we do not advocate dropping commonly used metaphors, we do suggest that teachers help students interrogate them (Levstik and Barton 2011). By making analysis of metaphors part of the instruction, teachers can guard against metaphors becoming barriers to learning.

In the case of metaphors regarding the function of artifacts, teachers might need only to push students' generalizations gently (“Is it really possible to get ‘the whole’ story? Why/Why not?”) and frequently remind students to consider different perspectives (“Even people living at the same time have different perspectives. How might different people living at this site have told their story? What differences might appear in differing perspectives?”). Even younger students recognize differences in perspectives, though they may not note them in historical work without some instructional reminders to do so. Based on our own and other research (Barton 2008; Levstik and Henderson 2015; Levstik et al. 2014), students require only modest instruc-

tional intervention to realize that we can never get the whole story of the past, even if we analyze every available artifact. With practice, too, students become more adept at building evidence-based interpretations of past people's lives (Levstik and Groth 2002).

Make the Human-Object Connection

Using objects as artifacts offers some challenges beyond those described in document-based analysis. The fifth-grade students, for instance, did not necessarily associate found objects with material culture (Levstik et al. 2008). Even the eighth and ninth graders did not always make clear connections between material remains and the cultures that produced them (Henderson and Levstik 2008). As a result, students benefit from explicit attention to *how* artifacts serve as evidence, just as they do from specific attention to the genres that students might use to interpret them.

Few teachers have the time Ms. Schlarb was able to devote to her *Archaeology Exploratory*, but students might, in fact, benefit from a more gradual introduction. Beginning with shorter-term inquiries organized around compelling questions, students could examine how people shape and are shaped by objects, and compare material culture and relevant technologies at different times and places (Levstik and Henderson 2015; Levstik et al. 2014).

CONCLUSIONS

Examining artifacts separately from a powerful instructional context is little different than examining artifacts out of their archaeological context. Teachers can begin archaeological inquiry with compelling questions that rely on analyzing human/object interaction. These questions can generate multiple interpretations and are accessible to student analysis. They motivate the kind of student interest that might best support challenging interpretive work.

In the context of investigating a powerful question about the past, then, teachers would include “reading” an artifact—which, like a document, requires interpretation—but which, unlike many documents, provides information about nonliterate as well as literate peoples. As a result, object-based investigations deepen students' understanding of groups and cultures, especially in the “deep” past for which no written record exists, and help them to better understand the full scope of the human experience.

Acknowledgments

The Henry Clay Memorial Foundation and the Kentucky Transportation Cabinet supported the excavations and our research at Ashland. We would like to acknowledge Jennifer S. Schlarb, our teacher colleague, and all the KAS archaeologists who worked on this project. The enthusiasm of Ms. Schlarb's fifth-grade students, many of whom are doubtless in college by now, and the insights they provided us have greatly contributed to our understanding of how children understand the past. Review comments on earlier drafts from Deborah C. Andrews were greatly appreciated. Cecilia Mañosa translated our abstract into Spanish; Eleanor M. King and Daniel Vallejo-Cáliz revised it. Figure 1 is used courtesy of Voyageur Media Group Inc. and the

Kentucky Heritage Council. KAS staff took Figures 2–3. Figure 4 is used courtesy of Project Archaeology.

Data Availability Statement

Pursuant to Institutional Review Board requirements to protect the privacy of research participants who are minors, audio recordings and videotapes were destroyed; IRB approval did not allow making full transcriptions of student interviews public. For more detailed data on student responses, see Henderson and Levstik (2010).

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NOTES

1. The Kentucky Archaeological Survey (KAS), created in 1995, is a statewide program jointly administered by the Kentucky Heritage Council (Kentucky's State Historic Preservation Office) and the Department of Anthropology at the University of Kentucky. The Survey's three-pronged mission is service, research, and education. KAS educates the public about Kentucky's rich archaeological heritage by sharing information about Kentucky archaeology and working with the public to make archaeology accessible to them through various programs and projects (<http://heritage.ky.gov/kas/>; Henderson 2014).
2. The teacher's name is real. The school name and all children's names are pseudonyms.
3. Our initial study was approved by the University of Kentucky's Institutional Review Board: IRB No. 02-0075.
4. The 2000 Ashland Archaeology Project was supported in part by the Henry Clay Memorial Foundation and Federal Transportation Enhancement funds administered by the Kentucky Transportation Cabinet. Since our initial study, educational videos and lessons have been developed about archaeology at Ashland: (<http://www.pbslearningmedia.org/resource/hisarch.ss.archeology/historic-archaeology-at-ashland-artifacts-in-a-privy/>); Sizemore 2012; Voyageur Media Group Inc. 2009; <http://heritage.ky.gov/nr/rdonlyres/7394fa26-9fe5-4adc-a962-7959c6d3d874/0/ashlandteacher.pdf>; Mañosa 2002).
5. A *learning center* is a space set aside in the classroom that allows students easy access to a variety of learning materials in an interesting and productive manner. Using these materials, students work by themselves or with others to operationalize the information learned in the classroom. Teachers use these centers to enhance student learning of concepts, skills, themes, or topics (Teacher Vision 2016).
6. Videotaping did not include the children who were not study participants. Videographers simply stopped the tape or recorded in a different direction without interrupting students' activities.
7. Audiotapes from 14 students could not be used because of technical difficulties.
8. Our follow-up study was approved by the University of Kentucky's Institutional Review Board: IRB No. 05-0221.
9. Our research into children's historical thinking raises questions about expectations of student learning. This is an important topic, especially when we consider that even some adults have difficulty making links between objects and cultures and appreciating the dynamic processes of historical understanding. After participating in an *Archaeology Exploratory*, is it too much to expect students to understand and appreciate (1) how objects are evidence, (2) time depth, (3) the basic features of historical understanding, and (4) differing perspectives? We cannot address this issue in detail here, but decades of research show that we can and should expose children to concepts and ideas like these early and often throughout their educational career (Arias and Egea 2015; Ashby 1997; Barton and Levstik 2004; Davis et al. 2001; Levstik and Henderson 2016; Levstik et al. 2014). Introduction and exposure are not mastery. Understanding takes time and repeated consideration of these concepts in a variety of subjects, but students can perform to and beyond expectations, if given the chance. Children today live in an increasingly connected world of diverse cultures. Exposure to diversity through archaeology, with its tangible connections to people, has proven to be developmentally sound and highly motivating.

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APPENDIX 1

Ashland Archaeology Education Research Project—Interview Protocol

Arrange students so that their voices can be recorded clearly by the tape recorder.

Say: You have been working on archaeology for some time now. I'm interested in how people your age think about subjects like archaeology. I'd like to ask you a few questions about the work you've been doing. This isn't a test. I just want to know what you think about these things. Thanks for your help with this.

Ask: (If students are slow to respond or confused by a question, restate or ask follow-up questions)

1. What is archaeology?
2. What do archaeologists do?
3. Why do you think people do archaeology?
4. Where have you learned about archaeology? In school? Outside of school?
5. What difference is there between archaeology and history?
6. What is an artifact?
7. How can artifacts tell us about the past?
8. Suppose that your neighbor hears that you are studying archaeology and brings you a bag of artifacts he's collected over the years at a site near his mother's home. He asks you if you can tell him the story of the people who lived at the site. How might you answer your neighbor? What problems might you have in trying to interpret these artifacts?
9. Why do you think archaeologists are so concerned about context? What does context mean? Why is it important?
10. [Present picture of site stratigraphy] Here's a picture of a portion of an excavation square or unit [see Figure 4]. Tell me what kinds of things you think have been going on—have happened—in this place.
11. [Present artifacts—see list below] Here are several artifacts. Which artifacts do you think were from longest ago? Which are from a time closest to now? Can you put them in time order, from longest ago to closest to now? Pick two artifacts that you find interesting. What kind of story can these artifacts tell?
12. Suppose that you are hiking through Red River Gorge and the trail leads you past a rock shelter. There's an artifact on the floor of the rock shelter. You are excited because you've just finished Ms. Schlarb's class and this artifact looks like one you found at Ashland. What should you do about this artifact?
13. Who should be allowed to dig at archaeological sites? What should happen to the artifacts once they are dug up?

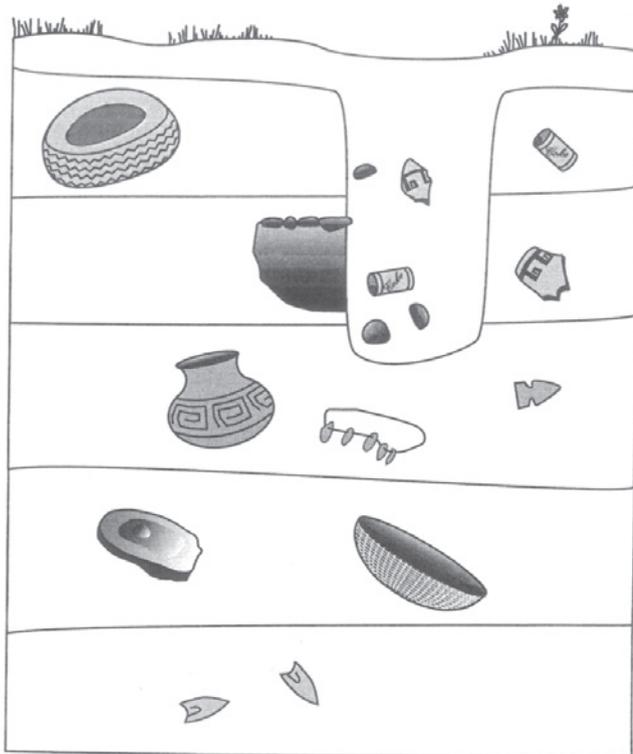


FIGURE 4. Image of stratigraphy used during student interviews (adapted from Smith et al. 1996:26).

Say: Thank you for your help today. I've enjoyed talking to you. I hope you've enjoyed your archaeological work these last few weeks.

Note: For Question #10, students were presented with a black-and-white drawing of a unit wall profile (Figure 4). This image was adapted from *Lesson Five: Chronology: The Time of My Life*, page 26, in *Intrigue of the Past: A Teacher's Activity Guide for Fourth Through Seventh Grades* by Shelley J. Smith, Jeanne M. Moe, Kelly A. Letts, and Danielle M. Patterson (1996). Washington, D.C., U.S. Department of the Interior, Bureau of Land Management.

For Question #11, students were presented with a group of artifacts on a tray. Four different groups of artifacts were used in this study, because interviews with four different groups of children were going on simultaneously during the interview process.

Each artifact group exhibited the same diversity of artifacts, in terms of age (both prehistoric and historic), material of manufacture, size, and so forth. All of the objects were real artifacts: no replicas were used. The following is a list of the artifacts used by one interviewer:

Prehistoric

- groundstone ax head
- groundstone nutting stone with one pit

Historic

- machine-cut square nail
- wire nail

- large rim sherd fragment from a prehistoric jar with incised designs
- chipped stone spearpoint
- shell ornament
- large rim sherd fragment from an Albany slipped crock with lug handle
- two glass buttons with four holes
- fragment of a blue-green glass canning jar

APPENDIX 2

Ashland Archaeology Education Research Project—Interview Protocol: Follow-Up Study

Arrange students so that they can be recorded clearly.

Say: Do you remember when you studied archaeology in Ms. Schlarb's fifth-grade class at Squires Elementary? I'd like to ask you a few questions about the work you did back then and the experience you had and what you remember. This isn't a test. We are trying to figure out how much students remember from different kinds of experiences, so your ideas about what happened all that time ago are very helpful. Thanks for your help with this.

Ask: (If students are slow to respond or confused by a question, restate or ask follow-up questions)

Introductory Questions

1. Do you remember your fifth-grade unit on archaeology?
2. When you look back on your fifth-grade archaeology unit, what are the things you remember most vividly?
3. What things did you find most interesting? Most important?
4. Have you studied archaeology since the fifth grade? If so, where?
5. Have you visited any archaeological sites since fifth grade? If so, when and where? Who took you to these sites?
6. What kinds of opportunities have you had to look at, collect, or investigate artifacts since your fifth-grade archaeology unit?
7. What kinds of opportunities have you had to use what you learned during the fifth-grade unit?
8. Why do you think people do archaeology? What might make archaeology interesting to some people?

Say: Now I'd like to ask you some specific questions about the unit to help us understand how you think about archaeology and what you remember from your earlier study.

Ask: (If students are slow to respond or confused by a question, restate or ask follow-up questions)

Questions

9. What do archaeologists do?
10. How can artifacts tell us about the past?
11. Suppose that your neighbor hears that you are studying archaeology and brings you a bag of artifacts he's collected over the years at a site near his mother's home. He asks you if you can tell him the story of the people who lived at the site. How might you answer your neighbor? What problems might you have in trying to interpret these artifacts?
12. [Present picture of site stratigraphy] Here's a picture of a portion of an excavation square or unit [see Figure 4]. Tell me what kinds of things you think have been going on—have happened—in this place.
13. Suppose that you are hiking through Red River Gorge and the trail leads you past a rock shelter. There's an artifact on the floor of the rock shelter. You are excited because you took Ms. Schlarb's class in fifth-grade and this artifact looks like one you found at Ashland. What should you do about this artifact?
14. Who should be allowed to dig at archaeological sites? What should happen to the artifacts once they are dug up?
15. How important do you think it is to learn about the past? Why?
16. In what ways do you think archaeology might help you learn about the past?
17. Is learning about the past important enough to spend time on it in school?
18. People sometimes say that students should not be allowed on an archaeological dig—that doing archaeology themselves will just teach them how to steal artifacts. What do you think about this argument? Would you agree? Disagree? How would you answer these people's concerns?

Say: Thank you for your help today. I've enjoyed talking to you.