

Cooper, Hilary ORCID: <https://orcid.org/0000-0001-7468-9910> (2020) Using artefacts to teach historical thinking skills to young children. In: Trskan, Danijela and Bezjak, Spela, (eds.) Archaeological heritage and education: an international perspective on history education. Slovenian National Commission for UNESCO, Ljubljana, Slovenia, pp. 93-114.

Downloaded from: <https://insight.cumbria.ac.uk/id/eprint/7117/>

Usage of any items from the University of Cumbria's institutional repository 'Insight' must conform to the following fair usage guidelines.

Any item and its associated metadata held in the University of Cumbria's institutional repository Insight (unless stated otherwise on the metadata record) may be copied, displayed or performed, and stored in line with the JISC fair dealing guidelines (available [here](#)) for educational and not-for-profit activities

provided that

- the authors, title and full bibliographic details of the item are cited clearly when any part of the work is referred to verbally or in the written form
 - a hyperlink/URL to the original Insight record of that item is included in any citations of the work
- the content is not changed in any way
- all files required for usage of the item are kept together with the main item file.

You may not

- sell any part of an item
- refer to any part of an item without citation
- amend any item or contextualise it in a way that will impugn the creator's reputation
- remove or alter the copyright statement on an item.

The full policy can be found [here](#).

Alternatively contact the University of Cumbria Repository Editor by emailing insight@cumbria.ac.uk.

USING ARTEFACTS TO TEACH HISTORICAL THINKING SKILLS TO YOUNG CHILDREN

Abstract

This chapter draws on a case study that applies the constructivist learning theories of Piaget, Vygotsky and Bruner to investigate ways in which young children can actively engage with historical artefacts. Teaching strategies include an integrated curriculum, site visits, teaching abstract concepts and, most importantly, whole class teaching which models historical enquiry through discussion. Data of pupil responses to previously unseen artefacts are collected at the end of each of four five-week units, through individual paper and pencil tests and recorded group discussions. These are assessed using a ten point assessment scale based on previous research and related literature. Statistical analyses found a continuous increase, over 4 units, in the quality of deductions and inferences about artefacts made by pupils taught using these teaching strategies.

KEY WORDS: HISTORICAL ARTEFACTS, CONSTRUCTIVIST TEACHING AND LEARNING, ASSESSMENT OF HISTORICAL THINKING, DISCUSSION OF ARTEFACTS.

Correspondence

Hilary Cooper, University of Cumbria, Fusehill Street, Carlisle CA12HH, Cumbria, England, Great Britain, hilary.cooper@cumbria.ac.uk

USING ARTEFACTS TO TEACH HISTORICAL THINKING SKILLS TO YOUNG CHILDREN

Aims of the Study

The larger case study (Cooper, 1991), from which this chapter on artefacts is drawn, investigated how whole-class teaching, based on discussion of historical sources impacted on eight-year old pupils' metacognition of the processes of historical enquiry. It aimed to reflect the enquiry approach of Collingwood (1946) who used examples from archaeology to explain his method of enquiry, based on his sequence of questioning. Collingwood (1946) proceeded from specific questions about the significance and purpose of artefacts to the people who made and used them, whether they were buttons, dwellings or settlements. For example he knew, from concrete evidence, that a Roman wall from the river Tyne to the Solway existed. He guessed that its purpose was to form a sentry walk with parapets to protect against snipers. He wanted to know if there were towers as a defence against vessels trying to land. He discovered that there were but their existence had been forgotten because their purpose had not been questioned. In this study children also learned to differentiate between knowing, hypotheses and what is not known.

The study aimed to establish links between Collingwood's processes of historical enquiry and teaching approaches based on constructivist theories of learning. It aimed to investigate to what extent children use 'because' in the ways that Piaget (1926) describes, the ways in which discussion with others can raise the level of thinking (Vygotsky, 1962), the ways in which children learn to use new and abstract concepts (Vygotsky, 1978) and the ways in which children can apply enquiry processes to new material (Bruner, 1966). It aimed to enable each child to think in these ways at the highest possible level.

Description of the Sample of Children

Two groups of twenty children in the 8-9 age-range, in the same school, were taught and assessed by the researcher in two consecutive years. The same lesson plans and teaching strategies were used for each group. Each group, which was a section of a complete class and therefore a non-random group, studied the same periods over the same time span, based on the same lesson plans and completed the same paper and pencil test at the end of each unit. There was also a group of the same age in another school, who learned the same periods of history over the same time span and was tested using the same written tests. This group was taught using 'traditional didactic

teaching methods'. The purpose of including this group children was to compare the responses of those of the groups taught by the researcher.

Each group was given the National Foundation for Educational Research (NFER) BD test 28 to provide a measure of general ability. A one-way analysis of variance, used to test the null hypothesis of no difference in general ability between the groups showed no difference (F value, 0.8 df 2,57).

Teaching Strategies for Groups 1 and 2

Cross-Curricular Approaches, Local and More Distant Site Visits

The purpose of a cross-curricular approach was to immerse the children in each period they were studying and to make meaningful connections across the curriculum. Links were made between artefacts and technology, fictional and non-fictional literature, mathematics, sciences and art. During each period there was a visit to a local site where evidence from the period had been found, and to a more distant site, aiming to make connections between local, national and international history in each period and also to give children experience of sites where artefacts of each period had been found. Table 1 shows the site visits during each unit of study.

Unit	Locality	Further afield
1	Farthing Down, Coulsdon, Surrey	Grimes Graves, Norfolk
2	Farthing Down Coulsdon, Surrey	British Prehistory Room British Museum
3	Riddlesdown Surrey	Lullingdon Roman Villa
4	Bradmore Green, Surrey	Aklowa (West African Village Herts)* *Aklowa was chosen as an example of life in a small, subsistence Farming community

Table 1 showing site visits during each unit of study.

Units of Study

The four units studied were the Stone Ages, the Iron Age, the Romans and the Saxons. This was because Bruner said that simple societies offer the best introduction to understanding the nature of man and society; these periods offer parallels with his Man a Course of Study (MACOS) project in the 1970s (see Bruner, 1961). In addition, there was local evidence of settlement during each period, but little

written evidence, which allowed for more valid 'guesses'. Collingwood (1939) said that literary sources blur the issues by repeating the authorities rather than asking questions of them.

Each unit lasted for five weeks. Every week there was one history lesson lasting over two 45 minute sessions. Each weekly lesson involved whole class discussion of one type of historical source (artefact, image, diagram, map and a written source). This chapter focuses on the lessons involving artefacts, although the same teaching approach was reinforced by applying it to each kind of historical source. The lesson plans in each unit involved key sources about evidence of settlement, daily life and belief; the contextual information. The lessons aimed to teach children to search for likenesses beneath the surface of diversity (Bruner, 1966) and to analyse information and order it in ways that permit interpretation and extrapolation across units (Bruner, 1963). The structure of all the lesson plans was the same, so that children might consistently build on their understanding of the processes of historical enquiry. Lessons plans can be found in appendices 1-3.

Lesson Structure

Lesson structure reflected learning theories of Bruner, Piaget and Vygotsky in the following ways.

Bruner and the Pattern of Whole Class Lessons

Bruner (1963) set out the principles whereby a discipline should be structured, so that the thinking processes and concepts that lie at the heart of it can be tackled from the very beginning in their simplest form, then in increasingly complex ways. To do this Bruner said that teaching materials must be revised in such a way that powerful ideas and attitudes relating to it are given a central role. In 1966 he said that this involved translating a subject into appropriate forms of representation which place emphasis on physical and sensory experiences (kinaesthetic), on appropriate imagery and on a set of logical propositions governed by rules (symbolic). Hence the focus on a sequence of units building on lesson plans with the same structure centred on concepts concerned with powerful ideas (beliefs, community, social organization), represented by physical, sensory artefacts explored through a set of logical propositions and questions. He said that the learner must be led through a series of statements and restatements that increase the ability to grasp, transform and transfer what has been learned to new material. Therefore the assessment strategies were organized in units, each building on the foundation of the previous one. Problems, Bruner said, must involve the right degree of uncertainty in order to be interesting, so it was made clear to the pupils that there were no single correct answers to the

questions but they needed to give reasons for their arguments and listen to those of others, possibly changing their minds as a result.

In each unit a photograph of an artefact was projected onto a large screen. The whole class discussed the same three questions about each piece of evidence, based on Collingwood's process of enquiry.

- What do you know FOR CERTAIN about this source?
- What REASONABLE GUESSES (hypotheses) can you make about it?
- What would you LIKE TO KNOW about it?

Through discussing each of the three questions and collating notes of their responses on a whiteboard under each heading, it was hoped that the children would learn to reflect on the difference between knowing, probability/possibility hypotheses and not knowing and to transfer these thinking patterns to new evidence (Bruner, 1966). (Lesson plans are given in appendices 1-3.)

Piaget, Explaining and Defending an Argument

Although the rigidity of Piaget's sequence in the development of logical thinking can be criticized and, although his experiments are generally concerned with manipulating physical objects in scientific ways, it seems reasonable to test his claims in relation to thinking about historical artefacts. This may be appropriate at the concrete stage of development when Piaget claims that children are able to take in information from the tangible and visible world, fit it into their own mental patterns – adjusting these sometimes to accommodate new information – and to store it and use it selectively to address new problems – another reason for sequenced units.

At a concrete stage of operations Piaget (1926) claims that children can form a reasonable premise and support it with a logical argument. They attempt to justify and demonstrate an assertion by using a conjunction (since, because, therefore), although they do not necessarily succeed in expressing a truly logical relationship. He says (1928) that children arrive at genuine argument through frequent attempts to justify their own opinions and avoid contradictions and are able to use 'because' and 'therefore' correctly to relate an argument to its premise, by an appeal their own authority and that of others. Discussion therefore has an important role. Vygotsky (1962) also shows that, between seven and nine years old children are increasingly able to form logical deductions in which factual claims are supported by reference to the evidence, using 'therefore' or 'because'.

With this in mind children in this study were encouraged, in response to their initial answer to each of the three questions above, to explain their thinking with a further clause. For example in question 1, 'I know this for certain... Therefore...' In question 2, 'I guess this... Therefore...' reflects Piaget's (1975) claim that at a concrete level,

children have an increasing awareness of what we know and what we can guess. Question 3, investigated children's acceptance that there are some things about the past which we do not know but that history is dynamic and new evidence provides new information so they were asked, 'What would you like to know, because...' (see Figure 1).

Vygotsky, Concept Development and Discussion

Vygotsky (1962) showed that concepts are learned, not through ready-made definitions but by abstracting common characteristics, through trial and error and experience. He suggested that concept development could be promoted by careful use of language and that concepts which are specially taught, because they belong to a particular discipline and are not acquired spontaneously, are learned more conscientiously and completely. The significant use of a new concept promotes intellectual growth. Following Vygotsky others investigated how concepts at different levels of abstraction might best be taught. Klausmeier (1979) found that the common features of concrete concepts, such as axes, scrapers and flakes, can be identified through discussion, leading to a more abstract concept, tools. Spears, and bows-and-arrows and harpoons have common purposes and so are weapons. At a further level of abstraction no images can not be held in mind so that language is essential in leading to discussion of overarching concepts such as power. Tools and weapons convey power. Other research endorsed the possibility that cognitive growth comes through social interaction. (Doise, Mugny & Perret Clermont, 1975; Doise, 1978; Doise & Mugny, 1979) showed that collective conflict of viewpoint is more effective than individual conflict and saw this interaction occurring at different cognitive levels. This reflects Vygotsky's *Mind in Society* (1978), where he introduces the concept of the Zone of Proximal Development, which suggests that children are helped to learn by working with someone at a slightly more advanced level than their own, or with a teacher.

Although Piaget concentrated on the interaction of individual children and their physical environment he also argued that conflicting viewpoints lead, at a concrete stage to decentration, the ability to consider multiple aspects of a situation. He, like Vygotsky, recognized the importance of discussion and interaction.

Based on Vygotsky's work on how concepts central to a discipline are learned, at different levels, through carefully selected visual examples and teacher-led pupil discussion, new concepts related to each lesson were introduced, with visual examples at concrete a concrete level. Their common features were explored, which led to a general classification (e.g. 'tools' and 'weapons'). Children were encouraged to use these words in further class discussions related to new material. They also learned them as 'spellings'. In the same way they learned major organizing ideas that run through societies: communication, power, values, beliefs. Some were open concepts

not exclusively related to history: trade, law, agriculture. Some were related to a particular period but not in use today: lynchet, wattle and daub, ealdorman. Children loved the challenge of using learning unusual words. Appendices 1-3, Lesson Plans, show how selected concepts were integrated into the whole class discussions.

Data Collection: Unit 1 – Paleolithic Flint Axes

Individual Written Tests

At the end of each unit the pupils were shown images of each of the five kinds of sources, but examples which they had not previously seen, on five consecutive mornings, and asked to complete individual ‘archaeologists’ reports’. The five artefacts used in the written tests are shown in Table 2. There was no time limit and they worked in silence (see Figure 1).

The archaeologist’s report was designed to encourage children to use a logical connective to form an argument based on a premise, to form two such arguments, and to use an abstract concept to synthesise the two statements, in the third column labelled ‘Conclusion’. The three questions encouraged them to make a distinction between knowing, ‘guessing’ and not knowing.

Evidence	Date	Archaeologist’s number
What do you know <u>for certain</u> ?		
	<u>Therefore</u>	Conclusion
	<u>Therefore</u>	
What reasonable <u>guesses</u> can you make?		
	<u>Therefore</u>	Conclusion
	<u>Therefore</u>	
What would you <u>like to know</u> ?		
	<u>Because</u>	Conclusion
	<u>Because</u>	

Figure 1. Archaeologist’s report sheet designed to reflect thinking patterns learned in whole class lessons (A4 paper).

Unit 1 Stone Ages	Unit 2 Iron Age	Unit 3 Romans	Unit 4 Saxons
Paleolithic flint hand-axes 200,000 BCE	Bronze helmet found in River Thames first century BCE	Shield boss found in River Tyne	Replica of Scepter; Sutton Hoo ship burial Early seventh century BCE
Slide: Museum of London	Slide: British Museum	Slide British Museum	Slide: British Museum

Table 2 showing artefacts used in written evidence tests.

Oral Evidence Tests

Small Group Discussion with the Teacher Present

Children in the first cohort made a tape-recorded discussion of each source used in the written evidence tests, in groups of five. The teacher intervened minimally, to prompt or cue. The discussion lasted 30 minutes.

Discussion Groups with No Adult Present

The second cohort, taught in the following year, made tape recordings of each source, in a room with no adult was present. They were simply asked to 'discuss this evidence'. There was no time limit but discussions lasted about 30 minutes.

Assessment of Data: Construction of a Ten-Point Scale

This scale was applied to both the written and oral tests. It was based on learning theories in *The Language and Thought of the Child* (Piaget, 1926) and *Judgement and Reasoning in the Child* (Piaget, 1928) on Vygotsky (1962) and his successors' work on concept development and on previous small-scale research applying cognitive development to history. The scale, outlined below, attempts to trace the embryonic stages in learning to form arguments about historical sources.

Level	Previous research
Level 1 Egocentric	Illogical. Leaps to unreasonable conclusions in one bound without attempting to prove or check (Piaget, 1926) 'Pre-operational' responses, illogical and unrelated (Peel, 1960) Unable to reverse operations (Lodwick, 1960) Misunderstanding and tautology at 'pre-operational' level (Thompson, 1962) No attempt to apply the information given (Booth, 1969) No explanation given (Rees, 1967) Illogical response at lowest level (Cooper, 1982)
Level 2 Descriptive (i)	Attempt to communicate intellectual processes to reader; these are factual and descriptive and show incipient logic which is not expressed; adapted information (Piaget, 1926)
Level 3 Descriptive (ii)	Statements of fact or description but argument is not supported with a reason (Piaget, 1926) At a concrete level children restate the evidence (Peel, 1960) Children reverse their thinking but only repeat the information given (Thompson, 1962) At a second level no attempt to go beyond the information given (Booth, 1979)
Level 4 Primitive Argument	Primitive argument begins with the statement of an opinion but the explanation for the deduction is only implicit or expressed in disconnected statements (Piaget, 1926)
Level 5	Logical deductions consist of one, two or more propositions which must be assumed to be true, to obtain a further statement which follows logically and necessarily from the first proposition (Peel, 1964) An increase with age in the number of statements supported by evidence (Cooper, 1982)
Level 6	Attempt to justify assertion by using a conjunction (therefore, because) but logical connection between assertion and the evidence is inadequately expressed The young child (7-8) rarely spontaneously uses 'because' or 'although' and if forced to finish a sentence, uses them as a substitute for, 'and' (Piaget, 1928) Children who have been taught specialized concepts and consciously been taught to use 'because' are more able to use them to complete a sentence fragment ending in 'because' (Shif, 1935)
Level 7 Genuine Argument (i)	A statement using 'therefore' or 'because' correctly Because becomes more frequent at about 8 years old in attempts to systematize one's own opinions, to avoid contradictions and as the result of internal debate (Piaget, 1926) Children of 8-9 are able to complete a sentence fragment using because if this has been previously taught (Shif, 1935) Increase with age of properly used conjunctions (Cooper, 1982)
Level 8 Genuine Argument (ii)	Two premises, each followed by a correctly used causal conjunction. If two premises were given with each followed by an argument connected by a conjunction it seems that this pattern of reasoning is securely established.
Level 9 Integrative Thought (i)	An attempt to synthesise previous arguments in the conclusion Explainer stage of weighted arguments using abstract prepositions (Peel, 1960) A child is finally able to formulate a rule which established a relationship between concepts (Vygotsky et al.)
Level 10 Integrative Thought (ii)	Previous arguments synthesized using one of the taught superordinate concepts (e.g. agriculture, community, trade) Synthesis of statements to create an abstract idea (Vygotsky and Piaget) Concept formation making inferences and learning to generalize from specific data to provide a cumulative sequence in the development of thought

Table 3 outlines ten levels in embryonic stages of learning to form arguments about historical sources suggested by previous research.

In assessing responses in the oral tests A4 pages were divided horizontally into ten sections representing the ten levels. A brief note of each statement made was written under the appropriate level. Arrows to the right show how a premise made by one child is developed as an argument by another child. Arrows to the left show how higher level general statements lead back to another simpler premise, which usually develops into another argument. This process was designed to show interactions within the group: building arguments, making generalisations and moving back and forth between the particular and the general (Bruner, 1966, p. 49).

The written evidence tests were assessed by the researcher and another marker. Reliability in assessment between the researcher and the independent observer, using the 10 point scale, was calculated using Cohen's (1968) Kappa coefficient across the ten categories of scores shown in Table 3. The value of Kappa is 0.764 with a Z value of 14.46, showed a very high degree of agreement between the two raters.

Analysis and Discussion of the Findings: Unit 1 – The Stone Ages

The archaeologists' written reports for units one, two and four were all analysed using the assessment scale in Table 3. Examples of responses to the Paleolithic hand axe heads are given at each level in the section below. Then different aspects of the data are analysed. Examples are given of the use of taught concepts in the written and oral tests, a comparison of the led and unled discussion groups, a comparison of written and oral responses, and an analysis of the ways in which children's responses reflected Collingwood's three questions. Finally there is an exploration of how children drew on background knowledge and how they referred to beliefs, values and social organization in societies different from their own.

'Archaeologists' Reports: Examples of Levels of Response to the Paleolithic Axe Heads

Examples are given of responses at each category of response, to the three questions, (What do you KNOW, What can you 'GUESS', What would you LIKE TO KNOW). These show the flavour and variety of answers, the appropriateness of the levels, and the need, sometimes, to look for logical thinking behind an answer. Donaldson (1978) pointed out that it is important to look behind the surface of an answer to the logic the child is grappling with to apply to a problem, which might be less clear than a 'pat' or learned answer but reflect real problem-solving and creative thought.

1. Egocentric (illogical)

Qu. 1: Their skulls weren't the same.

Qu. 2: They can't go to the shops.

Qu. 3: What were the children's games like?

2. Descriptive 1 (Attempt at logical deduction, inadequately expressed)

Qu. 1: Axe, dagger – split things.

Qu. 2: If they used spears we could know what animals they killed.

Qu. 3: I want to know how they did not cut their hands when they made the axe.

3. Descriptive 2 (Repeating information given)

Qu. 1: They have been carved to make tools.

Qu. 2: They are sharp and they have been carved all around.

Qu. 3: Where in the world they got the flint.

4. Primitive argument 1 (Going beyond the information given)

Qu. 1: The people were good craft makers because they made good tools.

Qu. 2: They made smaller weapons the smaller the animal.

Qu. 3: How did they eat when they didn't know how to make weapons?

5. Primitive argument 11 (Two statements going beyond the information given)

Qu. 1: I know they used flint for tools and tools for killing animals.

Qu. 2: They could have been used for chipping flint out of a mine or for chipping wood out of trees.

Qu. 3: I would like to know how cavemen learned to hunt animals and how they cured the Stone Age men when the animals hurt them.

6. Incipient argument (Attempt to use 'therefore' or 'because' but causal connection inadequately expressed.)

Qu. 1: We know they made axes to chop down trees for fire from this and they used flint. Therefore they used the flint for fire to keep warm under the trees.

Qu. 2: They had different sorts of flint. Therefore they lived in different places.

Qu. 3: I would like to know who invented it because if he/she invented it and nobody else did he might be the only person allowed to invent.

7. Genuine argument 1 (Correct use of therefore and because)

Qu. 1: They thought and worked. Therefore they're intelligent people.

Qu. 2: They used them for killing animals. Therefore they might have used the skin for beds and to cover their wives' babies.

Qu. 3: Did they make a lot of axes and did the axes always work, because then I would know if they made a flint axe everyday or if they sharpened them.

8. Genuine argument 2 (Two arguments, each using 'therefore' or 'because' correctly)

Qu. 1: They found flint in the ground. They made hand axes. Therefore they used them for killing animals and therefore they ate meat.

Qu. 2: They must have had antlers to shape the flint, because of the dents. Therefore they must have known the season the deer dropped their antlers and therefore the sun must have been a clock for the Stone Age people.

Qu. 3: I would like to know if they had spear heads or axe heads because you could tell if they were from Paleolithic or Mesolithic times, and I would like to know where they got the flint from because then you could tell if they lived near a flint shaft.

9. Integrative thought (Two arguments using 'therefore' or 'because' correctly followed by a synthesizing statement.)

Qu. 1: Flint was chipped. Therefore they knew how to make arrows and spearheads. And they are different sizes, therefore they knew which size they needed for different weapons. Therefore they were not primitive.

Qu. 2: The small black one could be a hand axe. Therefore they could decorate things. It could be the chief's wife's. Therefore they had ornamental tools. They had begun to take pleasure in themselves.

10. Integrative thought (As above, using a superordinate concept in the synthesizing statement)

There were no responses in Unit 1 test 1 at this level.

Spontaneous Use of Taught Concepts

Table 4 shows that some children are beginning to use concepts used in the class discussions spontaneously in their written archaeologists' tests and oral discussions.

Taught concepts used in lessons	Number of children in Unit 1 (Stone Ages) using each concept spontaneously.		
	Cohort 2 Written test	Cohort 1 Discussions with teacher to prompt and clue	Cohort 2 Group discussions with no adult present
Concrete			
axe	10	2	2
bows and arrows	8	2	2
antlers	1		
flint	22	7	4
archaeologist	8		
Abstract			
weapons	16	6	
tools	9	4	
invent	2	6	
hunt	15	4	
crops	2		
trade	1	6	
control	1	2	
protect	1		2
ceremony	6		2

Taught concepts used in lessons	Number of children in Unit 1 (Stone Ages) using each concept spontaneously.		
	Cohort 2 Written test	Cohort 1 Discussions with teacher to prompt and clue	Cohort 2 Group discussions with no adult present
Superordinate			
Neolithic	5		2
Mesolithic	1		2
Paleolithic	2		2
power	1	2	
attack	1	1	2
defend	1	1	2
communicate	7		1

Table 4 shows taught concepts used spontaneously by the second cohort in the written test, in discussion groups in Unit 1 with a teacher present and in the second cohort when no adult was present.

Oral Evidence Tests

Figure 2 shows that the content of the discussion was similar for the led and unled groups. There were differences in the structure of the discussions. In the unled groups there were more interjections, while the led group tended to revolve around a point until it was exhausted, then move on. Secondly although there was genuine discussion in the unled groups it tended to be about physical characteristics (the arrow has ‘wings’ ‘like an aeroplane’ – ‘like a hang glider’. Although both groups discussed the purposes of the artefacts the unled group did this vividly by telling highly imaginative stories to explain their ideas, which were nevertheless valid. The led groups made more general abstract points while the unled group concentrated more on concrete characteristics. The led groups achieved a more comprehensive discussion but lacked the vitality of the unled groups. All the discussions included differentiating between knowing, guessing and not knowing.

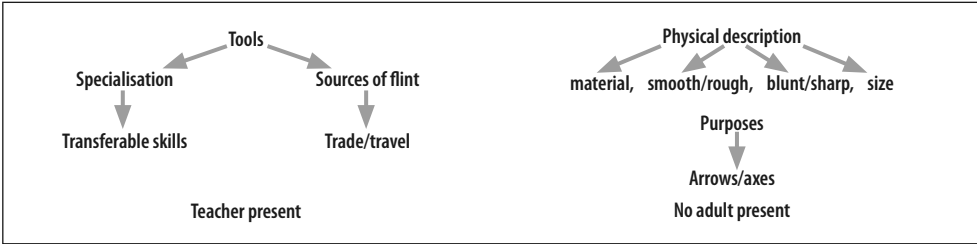


Figure 2. Analysis of the transcriptions shows that the content of the led and unled discussions about the Paleolithic hand axes was similar.

Analysis and Discussion of the Findings: Unit 2 – The Iron Age

Comparison of Written Tests and Group Discussions: Celtic Bronze Helmet 150-50 BCE

The responses to the written tests and group discussions were analysed under three headings, to investigate the ways in which they might reflect Collingwood's three key questions about sources. How was it made? How was it used? What did it mean to the people who made and used it? At the same time written answers were compared with the discussion tapes to see whether discussions reflected those in whole class lessons and whether discussion elicited different kinds of response compared with the structured written test. The findings are shown in Table 5. This also describes how children drew on their information about how metals are smelted, their concept of trade and their visit to the British Museum where they had seen the 'Waterloo Helmet', swords and shields.

Responses considering how the Waterloo helmet was made	
Written test	Discussion tapes
– They could smelt iron and bronze... > They had a furnace for getting iron out of the rock...	– They made it carefully with the right kind of metals. Certainly they used a mould and little rivets.
– I would like to know if the horns were hollow because that would make them lighter.	– They could print patterns on it. They had a habit of putting circles in their working.
– They must have had good minds to remember things > They knew how to get to learn (Qu. 1).	– They also had weapons – shields and swords. At the British Museum I drew a sword with a bronze hilt.
For protection in battle	
– I guess they wore it to protect their heads > They had fights. They made it > They made weapons > They had wars.	– 'It's got horns. It looks fierce – like an ox that could kill.' – 'Like a Stone Age hunter's deer antlers to hide in the bushes?' – 'The patterns could show what side you were on, so you didn't kill your own men.'
– I would like to know how they got the idea of armour and what did they fight about.	– They fought > I guess they fought for food. If there was a bad winter and cattle died, or to cut another tribes corn if they didn't have enough.
As a ceremonial symbol or a trophy	
– It might be made for a chief > he would wear it at ceremonies to look special.	– Maybe the more metal you had it showed how high up you were > They'd start with a beautiful bracelet until they were all covered in metal, as a chief.
– They might have used it at chariot races > They might have used it as a medal. They might have liked beautiful things and had it as an ornament.	– It may have been awarded for extreme bravery in battle. – Or maybe they had races and contests and the armour was awarded for use in battle.
– It might have been for a goddess.	– If they found other things in the River Thames they may be offerings to a water goddess, to thank her for water to drink.

As a commodity to trade	
– I would like to know where did the archaeologists find it because it would tell me if it was made there or if they traded them.	– Could they have traded it for helmets made in another land – or maybe for metal to make more weapons. Maybe, as we learned in a lessons, Julius Caesar wrote that they used rods of equal weight, or coins to trade.
– Was there one people in the place who made them because if they did they would be rich.	

Table 5 shows how examples of responses to the bronze helmet reflected Collingwood's 3 questions about sources (How was it made? How was it used? What did it mean to people who made and used it?). It also shows how answers in the group discussions were slightly more imaginative than in the written answers.

Concept Development

In Unit 2, as in the Unit 1, some children spontaneously used concepts learned through class discussions in their written tests and in the led and unled discussions. It is interesting that they also used concepts remembered from Unit 1 in later units. These children are retaining and using specialized vocabulary. It is also interesting that in Unit 1 and Unit 2 tests abstract and superordinate taught concepts used which were unlikely to be part of children's general vocabulary.

Reasons for the Omission of Unit 3 – The Romans

This unit was taught to both groups 1 and 2 and tested in the same way as the other units. However, results were not analysed due to time considerations, and it seemed that any findings of acceleration would be seen most clearly in Unit 4.

Analysis and Discussion of the Findings: Unit 4 – The Saxons

Replica of the Sceptre – Sutton Hoo Ship Burial

The Written Evidence Tests: Suggestions about Beliefs, Social Organization and Life in Societies Different from Our Own

Analysis of Unit 2 suggested that the ability to consider why people in the past thought and behaved differently from us develops from learning to make a fertility of valid suggestions about how an artefact was made, used, and what it way have meant to people at the time. In exploring children's responses to the Sutton Hoo Scepter children tested it against their knowledge, of Anglo-Saxon life, provided

during the five lessons on the Saxons. These discussions involved understanding of the concepts of kingship, power, law and succession (Appendix 3) and also about animals in Anglo-Saxon art, the uncertainty of Anglo-Saxon life, the need for loyalty and tales of boastful leaders (Beowulf) that they had learned in other lessons in Unit 3. This is illustrated by the following examples.

1) *The Deer (Qu. 2)*

The gold sculpture deer may be saying, save our lives, or where we live. Therefore maybe the scepter was saying kill us – or be warned – DIE. Or maybe the deer commemorates the beginning of the earth. That might be why the ruler carries it, to show how the ruler is for God on earth.

In qu. 3 this child wonders what it was used for in ceremonies, so we can find out the reason for the deer on top.

Another child guesses that:

‘It was an ornament. Therefore they made ornaments. And we can guess what sort of symbol the animal was, and therefore the symbol has something to do with animals.’

2) *Uncertainty of Life in Saxon Times*

‘I know the scepter is a good luck thing made out of stone. They wanted good luck because they were always fighting.’

3) *Kings*

They had kings. Therefore they must have had to be obedient.

They must have had to be loyal. They had a sceptre. It must have meant that it was a symbol of power. It must have been hard to be loyal to one person.

‘Why is there no picture of himself on the main part because it would tell us what sort of a king he was. Is he a boastful king?’

4) *A Symbol*

It must have been a symbol. Therefore it is precious. It was hard to make. Therefore it took a long time and so it is unique.

5) *Power*

Why have it? What is its purpose? Was it to show his power to rule, or to make people think he has the power? Would the king have thought it ruled the people’s minds?

These responses reflect eight-year-olds grappling with important questions. Was the scepter significant for the survival of the community? Did it assume divine power? What did the animal symbol signify? Did it represent good fortune in an uncertain world? Was it a symbol of power requiring loyalty and did it show, or convey ideas of power and in what ways did it influence people’s thinking?

Comparison of Led and Unled Discussion Groups

In Unit 4 both groups 1 and 2 made considerably more points at levels three/four and seven/eight than in the previous two units and made fewer illogical points. The unled groups, for the first time, made more points at level three/four than the led groups and there continued to be a difference in the way led and unled groups made their points. The led groups still tended to make more general statements, while the unled groups expressed them in the context of stories and images. The following examples illustrate this point.

Unled Group

Qu. 2. 'Maybe the scepter was locked in a special room and only used on special occasions' 'Perhaps it was displayed in the king's tent?' 'Maybe as a symbol of power over the community?'

Led Group

Qu. 1. 'It's too good to use in battle. It's a symbol.'

They discussed 'what the scepter represented' with the following suggestions: king's power, peace, God, succession, welcome, coming of age ceremony, riches, the community and unity.

Synopsis of Statistical Analysis

Improvement in Written Test Responses over Four Units: A Comparison of Groups 1, 2 and C (Control)

In order to analyse the difference between the groups across units 1 to 4 an analysis of variance was used. This was a three-way repeated measures design (two between, one within). The groups were the first main factor (A). The repeated measures were the artefacts (B) and the three levels were the three units and the three types of question (C).

Main Effect A

This found that there was a significant difference between the groups in responding to the artefact ($F=12.58$ df 57 $p<.05$). The mean for group 1 was 5.7, for group 2 was 6.1. and for group C was 4.4.

Main Effect B

There was a significant difference over units 1, 2 and 4 in responses to the artefact question. The means show an improvement in response levels ($F=16.3$ df 2 $p<.05$). The means for the artefact questions in Unit 1 was 4.9, for Unit 2 it was 5.5 and for Unit 4 it was 6.0.

Main Effect C

There was a significant difference between the levels of response to the three types of question about the artefact ($F=69.27$ df 2 $p<.05$). The means of the scores for question 1 (What do you know for certain?) was 6, for question 2 (What can you 'guess?') was 5.9 and for question 3 (What would you like to know?) it was 4.4.

Removal of Effects of Intellectual Ability

Although there was no difference between the groups' Non Verbal Reasoning Scores there were variations in the groups' scores in the written evidence tests. Therefore an analysis of variance on the first question of each unit (B was the repeated measure across the three groups). This showed that the differences between the levels of response of groups 1 and 2 and those of group C, which became increasingly marked from units 1-4, was not due to any difference in ability. The analysis of variance showed a strong significant difference ($F=12.30$ df 2.57). (12.30 would be found in fewer than 1,000 times.) The covariance analysis was even better ($F=17.06$ and 56 df).

Conclusion

There was a significant difference between the quality of responses in the written tests for groups 1 and 2, which improved over four units and group C. This showed clearly the impact of the teaching strategies used for groups 1 and 2. These were consistent and based on constructivist learning theories. They were based on open-ended, whole class discussions, which encouraged children to use taught concepts

spontaneously and to differentiate between what is known, what valid hypotheses can be made and what cannot be known about sources. Findings showed that eight year old children learned to use these skills independently in their writing and also in discussion groups, whether supported by a teacher or not.

Visits to local sites with evidence of settlement in each period and to museums and cross-curricular links are likely to have motivated groups 1 and 2 and informed their continued interest a twenty-five week project.

Appendices

Appendix 1. Lesson Notes for Unit 1, the Stone Ages: Artefacts.

Note: vocabulary underlined in lesson plans was taught as concrete concepts. Vocabulary in italics was taught as abstract or superordinate concepts.

Lesson 1. The Old Stone Age; <u>Neolithic</u> (following visits to Grimes Graves flint mines in Norfolk and Farthing Down Neolithic site, in Surrey).	
Evidence	Opportunities for responses at 3 levels
Archaeologist <u>Hand axes</u> <u>Chopping tools</u> Flake saw Scraper Chisel Polished (bone) Needles Awls to make holes in skins <u>Antlers</u> <u>Flint</u> <i>power</i>	We know: they became increasingly skillful and in control of their environment, using <u>tools</u> and weapons. They had tools for different purposes. The <u>weapons</u> gave them <i>power</i> to <i>defend</i> and <i>attack</i> . They could <u>hunt</u> .
	We can guess: they could dig up roots, chop up dead animals, scrape their skins, make clothes. They could remember, pass on skills, work together, kill animals, <i>invent</i> , <i>co-operate</i> .
	We do not know: the size of their groups/families, how far they travelled. How long they stayed in one place.
The Middle Stone Age: Mesolithic <u>Arrow heads</u> <u>Co-operate</u>	We know: bows and <u>arrows</u> are more silent and powerful than spears, they could shoot further, arrow heads can be retrieved. They had <i>power</i> . We can guess: they had fine muscle <i>control</i> , to make and fire and arrow heads. Good judgment of speed and distance. They could <i>control</i> herds while <u>hunting</u> , protect females with their young. They must have had to <i>cooperate</i> .
The New Stone Age: Paleolithic Stone hoe, sickle, grinding mill axes	We know: they grew <u>crops</u> , they lived in one place. We can guess: how they learned to grow seeds (observe, experiment, select). They grew <u>corn</u> . They ground the <u>seeds</u> , they lived in houses, they lived in a <i>community</i> . They could, <i>co-operate</i> , make <u>rules</u> . They lived in permanent places. We know: the axes were used to clear forest. We can guess: more tools were needed, they were made in special 'factories', they were <i>traded</i> in areas where there was no flint. We do not know: what they were <i>traded</i> for, how trade was <i>organized</i> .

Appendix 2. Lesson Notes for Unit 2, the Iron/Bronze Age: Artefacts.

Lesson after visits to the British Museum (https://www.britishmuseum.org) and Butser Ancient Farm, Hampshire (www.butserancientfarm.co.uk) and practical follow-up activities.	
Evidence	Opportunities for responses at 3 levels Selected concepts are underlined
Seen on visit to British Museum and discussed further in class: <u>horse brasses</u> , <u>coins with images of horses</u> , <u>model chariot</u>	We know: they bred <u>horses</u> , trained them and used them for draught. They had <u>brass</u> . They could <u>smelt</u> copper and tin to make bronze. They used money. We can guess: they rode horses. The horse was important to them. They had <u>transport</u> . They used money to <u>trade</u> .
This lesson also drew on practical activities related to making pottery in a pottery clamp, and making labelled models of a bowl furnace and a pipe furnace for smelting metal	We know: how they made pottery. We know: how they made <u>charcoal</u> . We can guess: that they <u>invented</u> this through making pottery. We know: how they <u>smelted</u> metal to make <u>bronze</u> .
Seen on visit to Butser Ancient Village and discussed in class spindle, loom weights <u>Grain store</u> Oven Quern stone	We know: they lived in a <u>community</u> . We do not know: how it was <u>organized</u> ; was there an owner? Were there <u>specialised</u> jobs? We know: they were getting <u>power</u> over nature. We know: how they spun wool. We know: how they wove cloth. We know: they made the roof with <u>thatch</u> with straw and how they made <u>wattle</u> and daub walls. We know: they could build a house. We can guess: it was warm and dry inside. We can guess: they dyed cloth and wore cloth. We know: how they stored the <u>grain</u> . We know: how they made <u>flour</u> . We can guess: that they grew <u>corn</u> . We can guess: they cut it with <u>sickles</u> . We can guess: that they farmed using a <u>plough</u> and oxen. We can guess: they had <u>domesticated</u> animals, since they lived in one place. We do not know: what other <u>crops</u> they might have grown whether they had <u>vegetables</u> . We know: they baked. We can guess: what they cooked.

Appendix 3. Lesson Notes for Unit 4, the Anglo Saxons.

This lesson relates to kingship, laws and social organisation.	
Evidence	Opportunities for interpretation
<p>1. Kingship</p> <p>(i) Map showing seven <i>kingdoms</i> in 700 A.D.</p> <p>(ii) Bede and the Anglo-Saxon Chronicle suggest that a <u>king</u> chose his successor – not necessarily the eldest son and that the king promised to serve God in a <i>crowning ceremony</i>. The crown was a <i>symbol</i> of kingship.</p> <p>iii) The king's council made <i>laws</i> (e.g. laws of Ine of Wessex, Aethelbert of Kent, Alfred of Wessex (examples given)).</p>	<p>We know: that there were kingdoms ruled by kings. A king's successor was made <u>king</u> in a <i>crowning ceremony</i>.</p> <p>We know: that there were <u>laws</u>, that people had to obey.</p> <p>We know: there were <u>laws</u> about land, homes, cattle, crops.</p> <p>We can guess: the <u>laws</u> were different in different kingdoms and at different times.</p> <p>We can guess: that they were ruled by strong kings and were fairly peaceful.</p> <p>We can guess: there were also <u>Wars</u> where kings had to defend themselves against enemies when they were <u>attacked</u> to protect their land and people.</p>

References

- BRUNER, J. S. (1963) *The Process of Education*. 25th Printing 1999. Cambridge MA: Harvard University Press.
- BRUNER, J. S. (1966) *Towards a Theory of Instruction*. Reprinted 1974. Cambridge MA: Harvard University Press. Repub. Belknap Press 1974. Cambridge Mass.
- BRUNER, J. S. (1965) *Man a Course of Study*. Occasional Paper no. 3. Educational Services inc. Cambridge Massachusetts. [Online] Available from: <https://files.eric.ed.gov/fulltext/ED178390.pdf>. [Accessed: 7th October 2019].
- COLLINGWOOD, R. G. (1939) *An Autobiography*. Oxford: Oxford University Press. (Republished: BOUCHER, D. & SMITH, T. (EDS.) (2017) *R. G. Collingwood: An Autobiography and Other Writings with Essays on Collingwood's Life and Work*. Oxford: Oxford University Press.)
- COLLINGWOOD, R. G. (1946) *The Idea of History*. Oxford: Clarendon Press. Revised Edition 2005. Oxford: Oxford University Press. [Online] Available from: <https://files.eric.ed.gov/fulltext/ED178390.pdf>. [Accessed: 17th October 2019].
- COOPER, H. (1991) *Young Children's Thinking in History*. Unpublished PhD. London: London University Institute of Education.
- DOISE, W., MUGNY, C. & PERRET CLERMONT, A. N. (1975) Social Interaction and the Development of Cognitive Operations. *European Journal of Social Psychology*, 5, pp. 367-383.
- DOISE, W. (1978) *Groups and Individuals: Explanations in Social Psychology*. Cambridge: Cambridge University Press.
- DOISE, W. & MUGNY, C. (1979) Individual and Collective Conflicts of Centrations in Cognitive Development. *European Journal of Social Psychology*, 9, pp. 105-109.
- DONALDSON, M. (1978) *Children's Minds*. Fontana. Republished 1987. London: Harper Collins.

- KLAUSMEIER, H. J. & ALLEN, P. S. (1978) *Cognitive Development of Children and Youth: a Longitudinal Study*. New York: Academic Press.
- PIAGET, J. (1926) *The Language and Thought of the Child*. Paris: Delachaux and Nestle. Republished 2002. London: Routledge Classics.
- PIAGET, J. (1928) *Judgement and Reasoning in the Child*. London: Routledge and Keegan Paul. Republished 2015. London: Routledge.
- PIAGET, J. (1975) *The Origin of the Idea of Chance in the Child*. London: Routledge. Republished 2014. London: Routledge.
- VYGOTSKY, L. S. (1962) *Thought and Language*, Wiley. Revised and Expanded Edition 2012. MA: Massachusetts Institute of Technology Press.
- VYGOTSKY, L. S. (1978) *Mind in Society: Development of Higher Psychological Processes*. USA: MA Harvard University Press.

References to Small-Scale Research Used in Constructing the Assessment Categories, Table 3

- BOOTH, M. B. (1979) *A Longitudinal Study of the Cognitive Skills, Concepts and Attitudes of Adolescents Studying a Modern World History Syllabus and an Analysis of Their Historical Thinking*. Unpublished PhD Thesis. Reading: University of Reading.
- COOPER, H. (1982) *Questions Arising in an Attempt to Interpret the Historical Thinking of Primary School Children According to Theories of Cognitive Development*. Unpub. Advanced Diploma in Child Development Dissertation. London: London University Institute of Education.
- LODWICK, A. R. (1958) *Whether the Inferences that Children Draw in Learning History Correspond to the Stages of Mental Development that Piaget Postulates*. Unpub. Dissertation for the Diploma in Education. Birmingham: University of Birmingham.
- PEEL, E. A. (1960) *The Pupil's Thinking*. London: Oldbourne.
- REES, A. (1976) *Teaching Strategies for the Advancement and Development of Thinking Skills in History*. Unpublished M. Phil. Thesis. London: University of London.
- SHIF, ZH. (1935) *The Development of Scientific and Everyday Concepts*. Moscow: Uchpedgiz.
- THOMSON, DF. (1967) Some Psychological Aspects of History Teaching. In BURSTON, W. H. & GREEN, C. W. (EDS.) *Handbook for History Teachers*. London: Methuen Green, pp. 18-38.