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## RESEARCH REPORT

# Encouraging Broader Ways of Talking About Animals and Nature: An Inquiry into Open-Ended Dialogue through Museum Collections with Year 2 Students

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### Abstract

#### Background and purpose

This practitioner inquiry was conducted at the University Museum of Zoology, Cambridge, to explore how open-ended, object-based dialogue can support young learners in developing broader ways of talking about animals and nature. Previous museum sessions often followed curriculum-linked formats that emphasised factual recall, which tended to privilege students with stronger prior scientific knowledge. The practitioner sought to create more inclusive opportunities for participation and exploratory talk through object handling.

#### Aims

The inquiry aimed to examine how open-ended questioning and reduced teacher direction could foster curiosity, imagination, and shared reasoning among Year 2 students. It also explored whether this approach might broaden participation, reducing the dominance of a small number of pupils and creating space for a wider range of contributions.

#### Design or methodology

Using a practitioner inquiry approach, two Year 2 classes (aged 6-7 years) took part in Habitat sessions in the Museum of Zoology's Discovery Space. Students worked in small groups, each handling animal teeth specimens (dog and cow). Three classroom teachers joined different groups at random, allowing comparisons between teacher-mediated and student-led discussions. Their discussions were recorded using audio devices and supplemented by observational notes, which formed the basis of this paper.

#### Findings

The contrast between teacher-led and student-led groups suggests that reduced teacher direction reshaped both the substance and distribution of classroom talk. Teacher-mediated dialogue centred on factual identification and curriculum-linked classification, typically structured through question-and-answer exchanges. In contrast, student-led discussions involved speculative reasoning, sensory description, and metaphorical association, with pupils building on one another's ideas and at times regulating their own dialogue. Participation in student-led groups appeared less organised around teacher nomination and more distributed across the group. Rather than responses being elicited from selected individuals, contributions emerged through collaborative exploration. This suggests that the open, object-based format created greater space for a wider range of pupils to contribute.

#### Conclusions, originality, value and implications

Starting sessions with open-ended dialogue encouraged deeper observation and more balanced participation. The inquiry highlighted the potential of stepping back as an educator to let children lead meaning-making. It also identified challenges in capturing non-verbal interactions, suggesting the need for different methods to better understand embodied learning in museum contexts.

**Keywords:** open-ended dialogue; object-based learning; museum education; practitioner inquiry; primary education

## Context

The inquiry formed part of the [Talking Objects Project](#) working with museum educators from across the University of Cambridge Museums and researchers from the Faculty of Education's Centre for Educational Dialogue Research group regarding use of dialogue, with input also from the Cambridge Teacher Research Exchange regarding inquiry into practice. The inquiry sessions took place at the University of Cambridge Museum of Zoology. The museum houses approximately two million specimens spanning the animal kingdom. Its collections range from large mammal skeletons to birds, reptiles, insects, and marine invertebrates, including historically significant material associated with figures such as Charles Darwin and Alfred Russel Wallace. As both a research and teaching collection, the museum provides access to authentic zoological material, offering a distinctive context for object-based learning.

This inquiry was conducted by Roz, the senior learning and engagement coordinator at the museum, during *Habitat sessions* for two Year 2 classes (aged 6–7), one held in the morning and the other in the afternoon. Habitats for Key Stage 1 is one of five taught sessions provided by the Museum, the others being: Marvellous Minibeasts and Animals of Africa for Early years; Skeletons for lower Key Stage 2; and Evolution for Upper Key Stage 2. All include a variety of activities, including games, time exploring the galleries, and object handling. The Museum delivers approximately 90 of these taught sessions per year to around 2500 pupils, all of which would benefit from this approach.

Habitats sessions are usually introduced through a guided activity in which learners construct food chains using puppets before moving on to object handling. For this inquiry, however, Roz stepped back from direct teaching and deliberately began in a more open-ended way, inviting students to observe and discuss animal specimens in small groups before any formal instruction. Each discussion lasted approximately 7–10 minutes.

Student dialogue was captured through audio recordings. With observations from two research assistants and Alison (the second author), the dialogue data were subsequently reviewed and discussed through our follow-up action learning session. We shared our perspectives based on our experiences as museum practitioners. Transcripts of the student dialogue and the observation notes formed the primary data for the analysis and interpretation presented in this.

## Motivation, focus and questions

Our inquiry originated from Roz's reflections on recurring patterns in her museum teaching. These reflections emerged through participation in action learning group sessions as part of the Talking Objects Project. Within these sessions, we examined how museum objects were used dialogically to enhance learning and to support critical reflection on our own practice.

Dialogue has long been recognised as central to learning and cognitive development (e.g. Howe et al., 2019; Mercer et al., 1999). Museum settings, as object-rich environments, offer distinctive opportunities for thinking with and around material artefacts (Noble, 2021; Star & Griesemer, 1989). These perspectives foreground dialogue around objects as a productive space for exploration, which formed the basis of our inquiry. We also engaged with the T-SEDA (Toolkit for Systematic Educational Dialogue Analysis; T-SEDA Collective, 2023) self-audit, which introduced us to dialogic codes such as

inviting to build on ideas (IB) and building on ideas (B). Both the action learning groups and the T-SEDA framework functioned as mediating tools, enabling us to analyse and refine our dialogic approaches more systematically.

Through this reflective process, Roz identified recurring patterns in her previous teaching. While some pupils arrived with extensive prior knowledge of animals, others participated less readily, and discussion could become dominated by a small number of confident contributors. She also recalled that many museum sessions closely mirrored national curriculum topics, particularly those centred on factual knowledge such as diet and classification. Although pedagogically coherent, this alignment may inadvertently privilege pupils who are already familiar with school science discourse and comfortable producing correct answers.

In response, we started the inquiry and aimed to move away from content-based recall questions and instead foreground close observation and open-ended interpretation of specimens. We were interested in whether students might be encouraged to exchange ideas freely and draw on their own experiences and observations, thereby helping to balance and promote participation within the groups (known to support learning gains when combined with building on others' ideas and respectful challenges: Howe, et al., 2019). In addition, we sought to explore whether pupils might develop alternative ways of talking about animals—beyond the factual language typically associated with school science or natural history media. By encouraging descriptive and exploratory dialogue, the inquiry aimed to create space for curiosity, imaginative association, and more varied forms of engagement.

Thus, the inquiry was guided by the following question: *In what ways does open-ended, object-oriented dialogue shape classroom talk and patterns of participation in Year 2 museum sessions?*

## Inquiry plan and activities

The inquiry took place in the Museum of Zoology's Discovery Space (Fig.1), a room surrounded by large glass cases displaying bird specimens.



Fig. 1: The Discovery Space, University Museum of Zoology, in Cambridge

This immersive backdrop situated the session firmly within the zoology museum context. For the sessions, the floor was arranged with brightly coloured animal mats set out in clusters, creating a playful and zoology environment that encouraged group collaboration and open dialogue about animals.

The sessions began with students working in small groups, each provided with a set of teeth specimens (Fig. 2), including a dog tooth and a cow tooth (Fig. 3). To orient the discussion, Roz introduced three open-ended prompts:

- What does it look like?
- What does it feel like?
- What do you think is important?

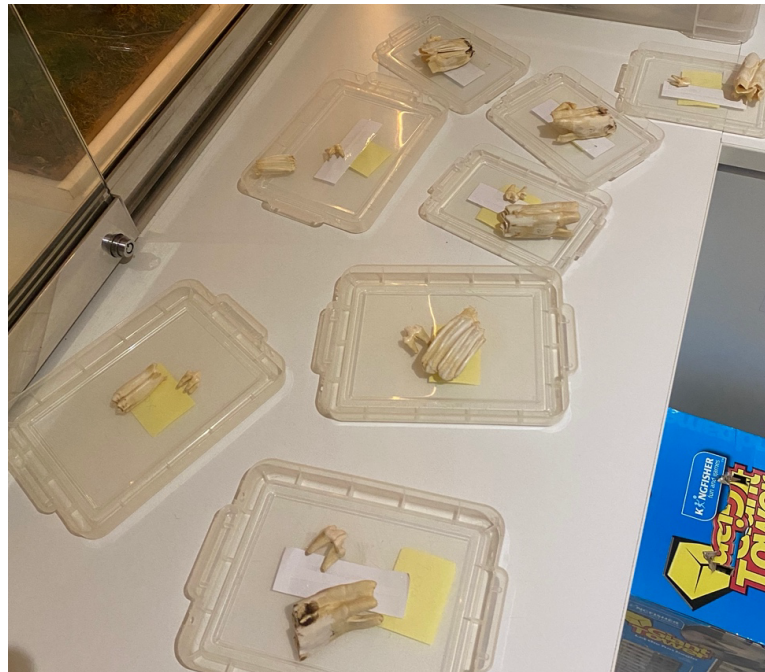


Fig. 2: Specimen sets provided for each group.



*Specimen 1: Dog tooth*



*Specimen 2: Cow tooth*



*Specimen 2: Cow tooth underside*

Fig. 3: Close-up view of the specimens: a dog tooth and a cow tooth.

These prompts were designed to guide observation while allowing students to generate their own interpretations. As the lead educator in the session, Roz adopted a facilitative rather than directive role, circulating between groups to ensure students were engaged. Three schoolteachers accompanied the students to the museum and participated in the session, joining different groups at random. As a result, some group dialogues were teacher-mediated, while others were entirely student-led.

Audio recorders were positioned close to each group to capture their conversations. Alongside these recordings, three observers took observation notes focusing on non-verbal cues such as gesture, touch, and posture, which helped to document how students physically interacted with the specimens and with one another.

After the sessions, we met with the Talking Objects team to discuss the session and the observation notes. Our conversation helped to identify pertinent themes and areas for further inquiry. The discussion particularly focused on two key themes: (1) the contrasting interaction patterns between teacher-mediated and student-led groups, and (2) the diverse ways in which students reasoned, speculated, and drew on imagination and personal experience when describing the specimens.

## Ethical considerations and relationships

Data for the inquiry included audio recordings, transcripts, and observation notes. All participating children were kept fully anonymised. Since students were recorded, both parental consent and individual verbal assent from the children were obtained after they had been fully briefed on the project and the purpose of the inquiry. Ethical considerations were discussed in advance with colleagues involved in the Talking Objects project.

Before the morning session began, Roz asked whether any children did not wish to have their voices recorded. Approximately three to four students raised their hands. A teacher confirmed that all parents had signed consent forms. In order to respect the children's preferences, Roz grouped those who did not wish to be recorded together, and they were not recorded. As a result, five of the six groups were recorded.

During the afternoon session, when Roz asked who did not want to be recorded, more than five students raised their hands, which was a higher number than in the morning. Given the increased number of students who preferred not to be recorded, the class was divided into seven discussion groups, two of which were not recorded.

## Findings

Due to capacity, we engaged in collaborative and reflective discussions of transcripts and observation notes from two observed groups in one of the Talking Objects group action learning sessions. Each transcript was drawn from a different session, one from the morning and one from the afternoon. Both sessions followed the same teaching structure and inquiry approach, allowing the team to compare interaction patterns under similar conditions. One of the most striking findings

concerned the contrast between the group that included a teacher and one that did not. There were noticeable differences in their patterns of interaction.

In the group where a teacher was present, the conversation appeared to follow a more instructional pattern, with the teacher guiding students toward curriculum points. These exchanges often revolved around factual identification and classification, such as herbivore and carnivore distinctions. For instance, in the teacher-mediated group from the afternoon session, the interaction unfolded as follows,

Teacher	What does a cow eat?
Girl B	Grass
Teacher	So, if it eats grass, it looks like this. And what tooth is it?
Boy D	A dog tooth, they eat dog food.
Teacher	Okay, what is dog food like?
Girl B	Meat.
Teacher	So, a cow is an herbivore, and a dog is a carnivore. Why do you think the carnivore has to have teeth like this?

We recognised how strong alignment with national curriculum expectations shapes the forms of dialogue that unfold in museum sessions. We noted that such expectations often prioritise clarity, coherence, and examinable content which may lead to the simplification of scientific and historical narratives. In our experience, introducing additional historical actors or alternative explanations was sometimes perceived as unnecessarily complicating the story by school teachers. We considered how this might reflect the influence of curriculum priorities, where emphasis can be placed on producing correct, assessable answers rather than engaging with uncertainty or multiplicity which is more often a feature of more open-ended and exploratory museum learning pedagogy.

In contrast, the student-led group without teacher mediation showed more exploratory and imaginative exchanges. Students described the specimens in sensory or metaphorical terms, often drawing on personal associations rather than formal knowledge. For example, the group in the afternoon session observed:

Boy A	This actually looks like—if you put that like that—it looks like a mountain?
Boy A	Because—does that look like a mountain?
Girl C	Oh yeah, it kind of looks like a mountain!
Boy B	Oh yeah!

We found that these student-led dialogues reflected a more open and creative engagement with the objects, suggesting that the absence of adult guidance allowed students to take greater ownership of meaning-making.

Moreover, even without direct teacher facilitation, some students demonstrated self-regulation and awareness of the discussion goals. In the unmediated group, a student reminded her peers to stay focused,

Girl A	We're meant to be describing it—not just saying what it looks like—we're meant to be describing it, like it's hard, pointy, sharp, yellow, that's good!
Girl B	[Yellow and old!] (laughs a bit)

We thought this particularly revealing, as it suggested that students were capable of maintaining purposeful, collaborative dialogue even without adult mediation.

Another finding that particularly intrigued us was how students reasoned through speculation, imagination, and personal experience, creating space for almost every student to contribute to the discussion. Their talk often moved fluidly between sensory observation, imaginative association, and tentative explanation. For example, in the unmediated group's exchange,

Boy B	Why is it white and yellow?
Girl A	That's because—I think that's because—
Boy B	It's probably dirty.
Girl B	Oh! I know why it's white and yellow—because it's old.
Girl A	It's been sitting there like a year.
Boy B	It's old.

Reflecting on her role as observer, Alison shared that, in the absence of teacher mediation, students engaged in more speculative forms of reasoning. She noted that their talk often involved informal hypothesis-building, as they considered whether the teeth might have been damaged, how such damage could have occurred, and what the animal might have been doing at the time. Students frequently related the shapes and textures of the teeth to familiar objects or experiences. For instance, one child commented that a tooth “looked like a mountain,” while another said the bumps on the back of the cow molar “reminded him of little sausages.” In our discussion, it was noted that, although this form of deep speculation might not align with conventional scientific reasoning, it nevertheless demonstrated students' close and sustained attention to the objects. This dimension of engagement was valued for encouraging careful observation and interpretive exploration within student-led dialogue.

Alison also recalled, both specimen teeth were ultimately broken after sessions. Reflecting on this, she described how, in previous sessions [outside of this inquiry], she had often been surprised when damaged objects were returned to her without fully understanding how this had occurred. Observing the students more closely on this occasion enabled her to recognise that their sustained and hands-on engagement, while remaining focused and purposeful, could lead to such outcomes. Rather than interpreting this as careless handling, we came to understand it as evidence of the intensity and depth of the students' exploratory interaction with the specimens. The children were not disengaged or distracted. Instead, they were testing possibilities, examining textures, and reasoning through physical manipulation. These reflections suggest that open-ended, object-oriented dialogue can support forms of reasoning that integrate sensory, imaginative, and experiential modes of thinking. Such engagement offers an alternative to purely factual or formal scientific talk and highlights the pedagogical value of granting learners time and autonomy to explore objects independently.

## Next Steps and Reflections

We found that beginning the sessions with open-ended observation had a noticeable impact on the tone and engagement of subsequent activities. This initial phase reshaped the overall atmosphere of the session. Having first examined the teeth in detail, students appeared to approach the later skull-handling activity with greater curiosity and analytical depth. The skull-handling activity allowed pupils to explore skulls through close observation and guided discussion. Skull handling provides the opportunity for students to see and feel more complex objects than teeth, looking at adaptations for different diets that impact the roles of the animals in their habitats. Roz reflected that typically during this activity, students were most interested in the identity of the skulls, but after the more open-ended exploration of the teeth at the beginning of the session, rather than simply identifying specimens with brief labels, they offered more detailed and exploratory comments about specific features and irregularities. In addition, students seemed to attend more closely to the objects, generating multiple observations and questions about unfamiliar or unusual aspects. This experience reinforced our intentions to incorporate similar open-ended, object-based observation tasks at the beginning of future sessions.

Beginning with questions such as "*What can you see? What does it look like?*" helped create space for more exploratory and nuanced dialogue. The material presence of the objects grounded dialogue in a shared perceptual field, orienting learners' talk towards something mutually visible and tangible. Rather than simply illustrating prior knowledge, the objects prompted noticing, questioning, and re-interpretation. Their textures, forms, irregularities, and ambiguities invited sustained attention and speculative reasoning. Importantly, this material focus also appeared to widen participation, compared to the team's experiences with previous groups. With attention anchored in the shared object rather than directed toward producing correct answers, more learners contributed observations and tentative interpretations. Ideas were offered more readily and taken up by peers, suggesting a shift from cautious response-giving to more open proposal-making. In this sense, the objects did not function merely as teaching aids but helped shape both the direction and distribution of dialogue. They appeared to slow interaction, encourage careful looking, and support ideas emerging from collective observation rather than recall. The material encounter thus created space

for uncertainty and multiplicity, enabling learners to explore possibilities instead of converging prematurely on predetermined answers.

However, the inquiry also revealed several practical challenges. One of the main challenges that emerged was the difficulty of capturing young students' rapid movements and non-verbal interactions during object handling. Their attention frequently shifted within seconds, and subtle changes in posture, gaze, or hand movement were not always accompanied by verbal explanation. As a result, key moments of reasoning or physical exploration could easily pass unnoticed, making it difficult to document precisely how understanding developed in real time.

These reflections point toward two directions for future practice. First, continuing to use open-ended, object-based dialogue as a way to deepen students' engagement and observation skills. Second, developing methods to better capture and interpret the non-verbal dimensions of young children's museum learning, such as gesture, movement, and touch. For example, introducing video recording could make it possible to study these embodied interactions in more depth, though obtaining consent for such recording would add an additional layer of ethical and practical complexity.

## Conclusion

This inquiry showed how open-ended, object-oriented dialogue can help young learners engage with museum collections in ways that extend beyond factual recall. By creating space for speculation, imagination, and sensory observation, we found that students were able to construct meaning collaboratively and express their ideas with confidence. The comparison between teacher-mediated and student-led groups further highlighted how dialogic space, when less constrained by curriculum expectations, can foster curiosity and shared reasoning among pupils.

For the lead practitioner, this experience reaffirmed the value of stepping back to allow children to take the lead in exploring objects. It also underscored how subtle shifts in facilitation, such as asking open-ended questions early in a session, can shape the tone of learning and encourage deeper observation later on. At the same time, the inquiry revealed important methodological challenges in documenting the full richness of young children's learning, particularly their embodied and non-verbal interactions.

Looking forward, the findings suggest that museum-based education can benefit from incorporating dialogic, inquiry-led approaches that value children's own ways of seeing and describing the world. They also point to the need for developing more robust ways of capturing the multimodal nature of such learning, which could further enrich both research and practice. As a small-scale practitioner inquiry, this study not only informed the practitioner's own pedagogical approach but also contributed to wider conversations within the Talking Objects project about how museums can support inclusive, participatory forms of dialogue around collections.

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