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Sparking the flame, not filling the vessel: How museum educators teach history in Australian museums

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ABSTRACT: This paper presents some results of research undertaken in nine Australian history museums during 2010 and 2011 on the work of museum educators. The research demonstrated that museum educators use the signature pedagogy of historical inquiry to actively teach history to students. This contradicts the dominant discourse of museum education research which focuses almost entirely on constructivist learning in museums. Findings in this paper may be of interest to museum and heritage educators, classroom history teachers, pre-service history educators and museum and heritage researchers. The case studies offer cultural institutions examples of how historical inquiry can be used to teach history in museums and heritage sites.

KEYWORDS: History, historical inquiry, pedagogy, constructivism, museums, formal learning.

Why study history educators in Australian museums?

When I was a secondary school history teacher, I often took my students on excursions to museums and heritage sites. The intention was to take them out of the classroom, away from the routine of the class timetable and to encounter a different teacher. I believed this would have a positive effect on their knowledge and understanding of history. Together we experienced a range of education programs. Some were more memorable than others—sometimes because of the uniqueness of the museums and artefacts and sometimes because of the educator's expertise. Interaction with the educator became an important part of our shared memories of the museum visit.

A visit to a museum or heritage site was an opportunity to disconnect the students from routines of learning that rely on reading and interpreting *written* primary and secondary sources. They offered an opportunity to physically interact with primary sources in a kinaesthetic and tactile way. The students could observe and handle unique cultural objects. In some museums they had the experience of being physically present in a place of historical significance.

As a teacher and 'customer' of education programs, I knew what worked with my students and what did not. It was easy to distinguish 'good' programs from the 'not-so-good' by the knowledge and enthusiasm exuded by the educator and, ultimately, his or her ability to capture the interest and imaginations of my students in the short amount of time they had together.

Years later, as a museum educator myself, I designed and delivered education programs with the hope they too would spark students' curiosity in history and archaeology. Most of the

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time I was able to achieve this, but sometimes, I felt I had not quite managed to engage all student visitors.

The learning programs I designed were constructed according to my belief that learning in history museums should challenge students to actively participate in *doing* history or archaeology, not just passively consuming it. I believe the educator should guide them through the process of thinking and encourage them to critically evaluate the constructions of history presented at school and in the museum. Most importantly, students should be able to use evidence from primary sources to develop their own interpretations of the past.

This experience of teaching and learning in museums inspired me to document the professional praxis of museum educators for my PhD research. What pedagogical dynamics come into action when educators delivered history education programs? How did *they* interact with students? Was it the same way I, and many of my colleagues, taught history in the classroom? Was it the same way I taught history and archaeology in museums? What constituted 'good' and 'not-so-good' learning experiences for students? What aspects of museum teaching engaged students in learning, and why? In sum, how did museum educators teach history in Australian museums?

Research on teaching and learning history in museums

To my surprise, after a few months of wide reading I found that museum education research focuses almost entirely on *learning*, not teaching; on *informal*, not formal museum contexts; on *science* not history museums and on *primary* not secondary years of schooling. Most case studies were from the US and UK not from Australia (Zarmati, 2018). Only a handful of researchers had examined the role of museum educators as active teachers in museums, and none had investigated the work of educators teaching history in Australian museums.

The literature revealed a distinct bias against didactic, interactive teaching in museums. Well-known American museum education researchers John Falk and Lynn Dierking (2000; 2002) and George Hein (1995; 1998) draw their knowledge and expertise from their backgrounds in science education and promote a constructivist approach as the only way of learning in museums.

Constructivism is an understanding that meaning, or human knowledge, is a construct that is expanded through active construction and reconstruction of mental frameworks. Learning is not a passive process of simply receiving information; rather it involves deliberate, progressive construction and deepening of meaning (Killen 2009). Constructivists argue that learning is most effective when it is student-centred and students themselves are actively involved in construction of their knowledge.

Falk, Dierking, and Hein make a clear distinction between teaching and learning, and position them in polarised, binary terms. 'Learning' is 'good' because it is derived from constructivist theory that promotes free-choice, informal learning. In contrast, 'education' (or 'teaching') is 'bad' because it implies formal, instruction focused programs based on behaviourist theory (Falk, Dierking & Adams 2006, p. 325). As a result, in museum contexts—especially in science museums— teaching is seen as negative because it is teacher-centred, didactic, and behaviourist while learning is positive because it uses a constructivist approach that is student-centred, experiential, and active.

Most museum education research is about learning in 'informal', 'free-choice' situations and ignores 'formal', educator-led programs. Indeed, the Canadian researcher Brenda Trofanenko (2010) pointed out that the majority of museum education research focuses either on visitor study evaluations or on the role and impact of objects on visitor learning.

In her study of museum educators in science museums in the United States, Lynn Uyen Tran argued that the work of high-profile researchers, such as Falk and Dierking and Hein, has been predominantly on the processes and products of learning. Tran's research showed that it is not correct to say that teaching in museums is didactic and lecture oriented. On the contrary, teaching science in museums requires creativity, complexity, and skills (2006).

Sharon Shaffer reminds us that early childhood educators have long been using objects to actively teach young children in museums. She recommends three methods to engage them: in-depth 'exploration'; contextualisation; and using the object as provocation (Shaffer, 2018).

The focus on visitor surveys and the bias against teaching can be interpreted as the result of the continuation of research on informal rather than formal learning and teaching in museums. The situation has changed little since the 1990s.

More recently, some American researchers have investigated ways of training teachers (Grenier & Marcus 2009; Marcus 2008; Grenier 2010; Marcus, Stoddard & Woodward 2012; Stoddard 2018) and pre-service teachers (Baron, Woyshner & Haberkern, 2014) how to teach their own students when they visit history museums and historic sites. However, those teachers are expected to spend a considerable amount of their own time visiting the museum and preparing learning materials for their students because American museum educators ('docents') do not provide a teaching service to schools, unlike the Australian museums and heritage sites discussed in this study.

Over the last 30 years a false dichotomy has emerged between those who advocate student-centred learning with minimal supervision (learning), and the handful of researchers who advocate guided, didactic instruction (teaching). The advantages of both taking place in the museum are not considered. The dominance of constructivist learning has had a profoundly negative impact on the understanding of the role of educators as active teachers in museums.

The research I undertook in Australian museums examines teaching *and* learning in what other researchers pejoratively call 'formal' museum education contexts. The history education programs I studied were aligned to school curricula, most were delivered by teacher-trained museum educators, met designated subject outcomes, and built on students' prior classroom knowledge and skills.

Museum educators who specialise in the design and delivery of history education programs form a distinct professional group within many museums in Australia. The case studies presented here provide a snapshot of the professional praxis and pedagogy of history educators in nine museums from 2010 to 2011.

Defining 'pedagogy'

Because my aim was to record the pedagogies used by museum educators and gain a clear understanding of their work, it was essential to begin with a clear definition of the term 'pedagogy.' Pedagogy has a range of meanings in current education literature. Dictionaries define pedagogy as "the profession, science or theory of teaching" (Concise Oxford Dictionary, 2008, n.p.), and most educators understand it to simply mean 'teaching' or the 'strategies' teachers use to teach.

The most fitting definition of pedagogy for this research is that posited by David Lusted which draws attention to the *process* through which knowledge is produced. It addresses the complex and inter-relational dynamic that operates between the educator, the learner, and the knowledge being transmitted. Lusted sees pedagogy as the 'transformation of consciousness that takes place in this interaction' (1986, pp. 2–3).

Lusted's definition counters behaviourist notions of the teacher as authority, the learner as 'empty vessel' and knowledge as immutable fact (for examples, see Hein 1995; 1998). Instead, it integrates the three concepts of teaching, learning and knowledge and reinforces the notion that teaching and learning are a collective process whose relationship is reciprocal and symbiotic. They work together in the dynamic of pedagogy, a process of interaction between the educator, knowledge and the learner.

Taylor and Young (2003, p. 12) also acknowledged the relationship between the teacher, learner and subject matter 'the central ingredients of teaching and learning'. In this 'pedagogical triangle', the teacher and learner communicate through the medium of the subject matter. Therefore, the definition of pedagogy as a complex interrelationship between the learner, the educator and knowledge transfer became central to the investigation.

How is 'pedagogy' different from 'Pedagogical Content Knowledge'?

If pedagogy is the dynamic relationship between educator, the student and knowledge, then how does it relate to educators' professional praxis, particularly in the context of Australian history museums? The answer is pedagogical content knowledge.

Pedagogy scholar Lee Shulman emphasises the importance of the connections between knowledge, teaching and students in his definition of pedagogical content knowledge (PCK). It is "the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction" (Shulman, 1987, p. 8). PCK goes beyond the subject knowledge (in this case, history) to the dimension of the knowledge and skills needed by the educator to teach the subject. It includes an understanding of what makes the learning of specific topics easy or difficult as well as the concepts and preconceptions that students of different ages and backgrounds bring with them to the learning (Shulman, 1986).

Grant (2003, p. 42) rightly positions PCK at the nexus between content and pedagogy, as "a place where teachers can pull from a palette of teaching strategies those which they believe will help and encourage their students to engage the particular ideas at hand." Simply put, teachers need to know the strategies that are best suited to packaging and presenting knowledge in ways that enhance students' ability to learn.

In the interviews presented below, museum educators discuss how they use their PCK of history teaching to design and actively teach secondary students who are visiting during school excursions. It is knowing *what* to teach and *how* to teach that enabled them to effectively communicate with student visitors.

Research method

Media critic and writer Marshall McLuhan (1911–80) once said, 'I don't know who discovered water, but I'm pretty sure it wasn't a fish.' Likewise, educators tend not to record or analyse their praxis because they are too busy living their experience every day. This is not to say educators are not self-reflective, or don't critique or evaluate their teaching or the teaching of others. The purpose of reflective practice for educators (especially classroom teachers) is to increase student learning and progression, and this is usually achieved informally—by reading and responding to their students' responses to their teaching—or formally through formative or summative assessment. A qualitative methodology with an interpretative paradigm offered the most appropriate research framework within which I could observe, record and analyse the work of museum educators in action (Merriam, 2002).

The first step was to find suitable museums in which the study could take place. Nine museums were chosen from a total of 15 that offered 'formal' history education programs designed for secondary students and actively taught by museum education staff. The nine museums were selected because they covered a range of history topics and curricula across different jurisdictions.

I corresponded with each museum by email to invite educators to participate in the research. Appointments were arranged for me to observe the educators teaching and to interview them afterwards. Table 1 shows that the nine museums offered a choice of either 'informal' (that is, self-guided) or 'formal' (educator-led) programs. I chose 'formal' educator-guided programs in order to examine the pedagogy and praxis of museum educators.

	Museum or heritage site	**'Informal' teacher-led or self-guided tour (free)**	**'Formal' educator-facilitated tour (fee for service)**
1	Australian War Memorial, Canberra, ACT	Yes	Yes
2	Hyde Park Barracks, Sydney, NSW	No	Yes
3	Immigration Museum, Melbourne, VIC	Yes	Yes
4	Melbourne Museum, VIC	Yes	Yes
5	Museum of Australian Democracy at Old Parliament House, Canberra, ACT	No	Yes
6	Museum of Sydney, NSW	No	Yes
7	National Museum of Australia, Canberra, ACT	Yes	Yes
8	Port Arthur Historic Site, Tasmania	Yes	Yes
9	Sovereign Hill, Ballarat, VIC	Yes	Yes

Table 1. 'Formal' versus 'Informal' programs offered by museums in the study

Next, I observed 12 museum educators (Henry, Olivia, Eva, Veronica, Belinda, Charlotte, Natasha, Beverly, Grace, Isabelle, Madeline, and Sharleen) teach history to secondary student visitors in 10 education programs. Participants' names were changed to protect their privacy and so they could not be connected to their workplace.

I recorded my observations of the pedagogy they used to communicate knowledge and develop skills. My initial idea was to use a prescribed check list of teaching strategies, but prior sample-testing in two museums revealed the presence of my own expectations and biases in the recording. The process proved to be less subjective when I simply described the teaching strategies as they were enacted by the educator. This provided a more authentic and less biased record of the teaching strategies used by museum educators, thus enabling me to record pedagogy in action.

I then conducted in-depth interviews (between 45 minutes to one hour) with the museum educators using semi-structured questions. This allowed them to 'speak for themselves' as

freely as possible. Interviews were electronically recorded, transcribed, and coded. Categories were created, synthesised according to axial coding procedures, and analysed using NVivo software.

The most commonly-used strategies were:

1. Making curriculum links;
2. Using historical inquiry;
3. Guided questioning;
4. Storytelling;
5. Immersive sensory experiences; and
6. Role play and dress-up.

They are described below, interspersed with relevant comments by the museum educators.

Strategies used by museum educators to teach history

1. Linking the Curriculum

At the time I undertook this research (2010 to 2011), the Australian Curriculum was still being developed, so states and territories were responsible for designing their own syllabuses or learning programs for history without the influence or guidance of the national curriculum document. Museum educators Olivia, Henry, Eva, and Veronica said that the first thing they do when they begin planning learning activities was to consult syllabus documents to find content that matched their museum or exhibition and from there, they developed learning outcomes.

They said it was important to connect the objects and themes of the museum with curriculum content and learning outcomes. This is because teachers need to justify the educational benefits of taking students on excursions to school administrators, and are required to show the link between what they will learn in the museum with what they are learning in the classroom. This is in contrast to the practice in other museums where the objects in the museum shape the content of the program (Bourdon Caston, 1989).

Henry said curriculum linking was the hook they used to market their programs to schools.

> And you know, decisions will be made about whether or not it's worthwhile constructing a program for a temporary exhibition depending on whether it does have syllabus tie-ins or not. And when the programs are constructed, and you get them there, it's clearly outlaid how they tie into the syllabus and I guess that's how you market them to the schools. So, it's, 'Look at how we connect into the syllabus, come and see us.

For Olivia, curriculum linking is her first priority:

> It's about looking at our audience and what we want to communicate to that audience, and what strategies would work for that audience. We always come from a curriculum basis and sometimes the content leads, but one of the very first filters we look at is the curriculum.

Eva stressed the importance of using curriculum-specific learning outcomes to design learning activities:

> I would say what I am looking at first of all is the outcome. When I am writing a program the first thing I do is my educational outcome. Because that in turn usually dictates the consistency of the program: sixty students coming in, four different presenters, they should all leave with basically the same outcome, and they are linked in with curriculum.

Veronica also emphasised the importance of linking to curriculum learning outcomes:

> We always look at the educational outcomes, what we want the kids to learn. What we want them to find out. What do we want them to come away with? What do we want them to learn? So, we have aims and objectives for what we want, what we want the program to fulfil. And there is always a handling, object handling component. There is always a gallery exploration component. What do we want the kids to learn from being in this exhibition? How is it going to relate to the current curriculum? How are they going to engage with it?'

2. Historical Inquiry

According to the Australian Curriculum, historical inquiry is a process of investigation undertaken in order to understand the past. Steps in the inquiry process include posing questions, locating and analysing source and using evidence from source to develop an informed explanation about the past (ACARA 2018). All programs I observed used historical inquiry to structure learning activities. Some museums were explicit about telling students the problem or mystery they would be investigating. Others simply followed the process of asking questions, interrogating sources, and developing interpretations with the students.

Most learning activities took place in dedicated learning spaces in the museum. Students were able to handle and examine a pre-selected suite of authentic primary sources—such as artefacts, photographs and written sources—that were relevant to the topic and the inquiry question. Students either put themselves into groups or were allocated to a group by their teacher or the museum educator.

Belinda begins her presentation by introducing the topic, then relates what the students will be seeing and doing at the museum to what they have been studying at school. Belinda emphasises that all the programs at her museum are "all based on inquiry":

> It's all about kids finding the answers themselves. I think that kids learn better that way than being talked at by giving them things to elicit their own questioning and then with help from you. You guide them towards the answer even though they feel as though they have found the answer themselves. You are giving them the skills to find out the answer and I think it's more fun. It's a better way to learn. And it certainly suits the site in terms of the material culture we have got all around us here. It works well.

During the process of historical inquiry, educators guided students through a series of steps which could be linear or contiguous and tended to follow this order:

1. The educator explained the inquiry question that would focus the investigation. This was usually predetermined by museum education staff in relation to curriculum content and outcomes, or developed by the teacher and/or students in consultation with the museum educator;
2. The educator guided students through the process of examining sources in order to locate evidence in response to the inquiry question. Teachers actively participated by moving amongst the students and asking open-ended questions to help them locate evidence in the sources relevant to the inquiry question;
3. Students synthesised the information they had gathered from the sources and developed their response to the inquiry question; some students developed their own interpretations to either refute or support the inquiry question;
4. Students sequenced information in a logical argument or interpretation in response to the inquiry question; and
5. Due to time constraints of the visit (usually between 50 minutes to 1.5 hours), students elected one representative to present the findings of the group to the whole class. The educator (and sometimes the teacher) responded to student presentations by

supplementing students' findings with additional information that was relevant to the museum and the curriculum topic.

The strength of an inquiry approach is that it is open-ended, does not aim to achieve a 'right' answer and allows for multiple interpretations (Hattie, 2009). This fits well with the polysemic approach to the interpretation of history that underpins state and national curricula in Australia (ACARA 2018).

During the process of historical inquiry students are encouraged to think historically by asking historical questions, identifying contradictions and conflicts, and developing interpretations supported by historical evidence. Fundamental to the process of historical inquiry is the interrogation and evaluation of sources, primary and secondary, written, material, and archaeological.

Every educator in the ten education programs used some or all features of historical inquiry to teach historical thinking. Some educators told students they would be undertaking an historical inquiry, others jumped straight in and began worked historically with students, asking questions, interrogating sources, and developing interpretations.

Teaching historical inquiry is a priority for most of the history educators in the study, and teachers expect and like their students to be challenged to think outside the boxes. Educator Grace provided a detailed example of how she used historical inquiry to analyse an artefact with a class of Year 9 boys, and educators Isabelle and Grace said that teaching critical thinking was an important part of the learning experience for students in their museums.

The use of historical inquiry provides several beneficial learning outcomes. First, research has shown that the problematisation of history engages students' interest and actively involves them in the processes of historical thinking (Bain, 2000; Brophy & VanSledright, 1997; Gerwin & Zevin, 2011).

Second, because of their proximity and access to primary sources, museum educators can use authentic artefacts and sites in their teaching. In fact, the chance to see and even handle historical artefacts, especially those considered to be 'really old' or 'national treasures' is anecdotally one of the main reasons why teachers take students on excursions to museums and heritage sites. Third, using historical inquiry in museums engages students in the active process of *doing* history because they can physically interact with artefacts and sites through guided investigation.

Fourth, through the process of historical inquiry, educators and students can learn to challenge "official versions of the past" (Trofanenko 2010, p. 217) and singular interpretations presented in some exhibition narratives. By encouraging students to think critically, museum educators can 'advance a critical understanding of how museums use exhibits to fulfil their public commitment to educate citizens about their nation, the nation's past, and about how nationalism and citizenship are entwined with history' (Trofanenko 2010, p. 280). Styles (2002, p. 174) refers to this as 'reflexive representation,' or drawing attention to the representational practice in such a way that visitors recognise that exhibition materials are 'staged' and interpreted. Finally, historical inquiry provides a heuristic framework in which educators and learners can work together in the process of historical thinking.

3. Guided questioning

The teaching method most commonly and consistently used by educators to communicate with students was questioning. Its purpose is to engage students in a dialogue of learning. All educators used a combination of closed and open-ended questioning. Closed questions were used by all educators to elicit student responses about specific historical knowledge.

Educators who were most successful at engaging the interest of students used open-ended questioning skilfully, to stimulate critical thinking, extrapolation and lateral thinking.

This is in contrast to Tal and Morag's observation of simplistic questioning techniques used by guides in natural history museums in Israel. They conclude that learning experiences were not effective because:

> The questions being asked at the museum are often closed and/or factual questions that do not require complex thinking from students. Quite often the questions are asked with no follow up, elaboration, or any attempt to make the students apply previous knowledge (Tal & Morag 2007, p. 748).

British museum educator Frances Sword eloquently explains that discussion through questioning is the museum educator's most powerful tool because many are forced by lack of space, time, money, and staff to work within a limited sphere of activity:

> With words we have to paint, mine, weave, pot and carve; our words have to create experiences that enable children to make sense of what they see ... I believe that the key which unlocks a child's imaginative contact with an object begins with a careful selection of ideas, and continues with an equally careful use of words … Most of us work from a discussion base, talking with rather than to children; our questions, which direct attention, create focus, and open discussion deserve close scrutiny (1994, pp. 7–8).

Beverly identified guided questioning as the most important teaching method she uses:

> I think for me the most important one is questioning and answering, so letting them have a look and have a bit of an explore and a think and then asking them questions about what they found, hearing their opinions, hearing their thoughts and giving them a chance to speak about what these things meant to them, and providing feedback if they wanted as well. I think that's really important for me. I mean you can stand up and give information which is also very helpful but yeah, interacting, giving them a chance to question you as well.

Charlotte recommends that educators engage students' attention and pique their interest in history by facilitating discussion rather than lecturing at them:

> Facilitated discussion is the big one. And that's got a lot to do with how we approach our role. I see our role as that we are not teachers. We are not in a classroom and it's not our role to give forth information. We very much emphasise the idea of people expressing opinions and all the rest of it. We always come back in the team to that quote, 'education is sparking the flame, not filling the vessel'. So, we take that very seriously in our approach. I would say the biggest skill we have got is being able to facilitate discussion rather than looking at ourselves as teachers of information or givers of information.

Educators used a mixture of closed questions to elicit specific responses relating to substantive knowledge—such as 'In what year was gold discovered in Victoria?'—and open-ended questions that encouraged students to think and interact with the educator and each other when giving their responses:

> It's about being a bridge between the students and the collection I think. And it's getting them to think. We want to provoke the questions, so we ask lots of questions in terms of technique. We don't present information ideally; we give it but we try and get the students to come to the information or to come to conclusions themselves. We might give a stimulus, like 'this is a bit of a story' or 'look at this object', or 'what do you think?' We ask a lot of questions, it's in the way that we are facilitating discussion. It's not about what we know, it's about what the students can figure out and deduce and discuss. And a lot of our activities and things are about discussion, they are not about filling in sheets, they are not about getting answers right (Charlotte).

Here Grace skilfully recounts a question and answer discussion she had with a group of Year 9 students. She describes how she uses the process of historical inquiry to interrogate artefacts and lead students to a deeper understanding of Victorian social history:

> I often use objects and that questioning technique, and I use something they know. An example I used yesterday in my health lesson, I gave them a cake of soap, a candle, candle mould and a melting pan and I said to them:
>
> 'What is the connection between all these things and what's it got to do with health?'
>
> And they said, 'The melting pan does not go with the candles.'
>
> Then someone said, 'Maybe it was to melt the wax'.
>
> And I said, 'Why do you melt the wax with this?'
>
> And they said, 'Oh, because it looks like a fry pan'.
>
> Then someone else said, 'If you turn it upside down you can use it as a meat tenderiser'.
>
> And we went on and on and then I said, 'What's it got to do with health?'
>
> Someone said, 'You could burn yourself when you're pouring the wax into there.'
>
> And I said, 'Well what if I told you that candles and soap weren't made from wax in the 1850s, what would you say to that?'
>
> They said, 'Ah, okay, what were they made from?'
>
> Then someone said, 'What about fat?'
>
> Then I said, 'do we make soap today from animal fat?'
>
> And they said, 'Oh no, that's disgusting'.
>
> So, out comes the twentieth century Coles 'Citrus Fresh' bar of soap. I said, have a read of this. What's the main ingredient in that? Sodium talloate. What's that? Animal fat!'
>
> 'Oh, come on we don't wash our bodies with fat!' they say.
>
> And it went from there. I find that so exciting!

Isabelle describes the skills involved in asking open-ended questions that elicit thoughtful responses from students:

> I give quite a bit of thought to my questions because I want them to have the satisfaction of working it out for themselves. And I think once you've worked something out for yourself it has an imprint in a way that someone telling you doesn't. It's a feel-good moment, and if learning is a feel-good experience they'll want to do more of it. And when they work it out it's a feel-good moment for me.

Frances Sword emphasises the importance of the other side of dialogue: listening to students' responses and encouraging them to ask questions, a skill that can be overlooked by some museum educators and teachers:

> Above all, we must learn to listen to the children for our cues to catch the moments which enable observations to develop into creative thinking. In this ability to listen and respond to the individual child lies the essential difference between a presentation and a genuine discussion (Sword 1994, pp. 7–8).

John Hattie (2009, p. 246) advises that successful teachers need to be "adaptive learning experts" with high levels of flexibility that allow them to innovate when teaching sequences do not engage students in learning.

The most successful educators combined historical narrative and explanation with the dialogic interaction of questioning. The time spent on explanation varied, but it was clear that the longer the educator spoke without engaging in dialogue with students, the more likely it was that students became bored and restless. The most skilful and entertaining educators were those who used humour and storytelling to capture students' interest in the subject matter. They were also able to keep their attention by reading their reactions and modifying information or switching to a different activity if students lost interest.

4. Storytelling

Educators in all the education programs I observed used storytelling to adapt historical information to the appropriate age group and engage students' interest. Students have a better chance of remembering historical details if they are communicated in story form:

> As I often say to our education staff when we are training them, what do you want the students to walk out the door with? When you are doing a program what do you want them to remember? If you are going to give them a whole lot of facts their short-term memory might be that they will remember eight of the ten facts you have given. But in a week's time, a month's time, a year's time what will they remember? Chances are they are going to remember a story, and you can link in historical content into a story and do it quite well (Eva).

> I think a love of history is a huge bonus, but I think if you can back it up with some great stories from history that gives it a whole lot more whack. And I am never going to compromise that. Even though sometimes people say I spend too long on the introduction, I don't often see the kids sitting there fidgeting or wanting to go, because they love stories. And that's what the museum is all about, telling the stories of history. Having that understanding of history and what's gone on in the past and how we can learn from it and all the stories (Veronica).

Natasha is a senior educator who is responsible for designing history programs and training education staff at her museum**:**

> This is where the teaching experience comes in because if you're running an interactive session, and our approach is not to just put up a PowerPoint and talk at them, it's not just talk; it's actually an interactive session so it's more a dialogue. If you can only stand out the front and deliver what you've been told to deliver, then you're not going to get this kind of dynamic and actually the programs are designed to invite what the learner already knows. That's my whole premise, that you build on what they already know, and you need to find out very quickly in that context what they already do understand so you're not telling them, so they feel like they're participating in the process of telling the story.

5. Immersive sensory experiences

At Veronica's museum, hands-on, kinaesthetic learning is a priority:

> We always get the kids to handle, and we like to get them to think of the stories, so they have got different avenues of approach to getting them enthused and to learning about the stories. And I think the hands-on is particularly important, so learning by doing.

Other educators commented on the impact that spatial and sensory experience can have on student learning and its capabilities in their teaching. Isabelle said,

> I think it's the power of the building. It's the novelty factor, and I try and develop that as well by drawing attention to where they are and asking them 'what are some words you'd use to describe this place?' so that they are aware of what sensory experiences they are having. So that they notice things, they smell things, the feel the chairs that they're sitting on. I try and point out or encourage them to notice the different things about the building and then build on that. And the focus isn't on me. It's on getting *them* to imagine. That's part of the sensory experience and the learning outcome too because I think that has an imprint.

Henry attributes the popularity of the museum where he works to the fact it is also a historically significant site, "physically you are looking at history where it happened":

> I think that's part of the idea behind the museum. By asking people to physically engage, by opening or touching interactives, you are actually then engaging their intellect in it. So, you are drawing them into the story you are trying to tell; I like that as an idea. Interaction as a way of engaging people.

Belinda commented on the power that an immersive, spatial experience can have on students' memories and learning:

> I think the difference has to be a physical experience, you know, a sensory experience that provokes questions. It's not about just presenting facts because that would be boring. So, in a lot of the ways we are halfway there because the engagement is almost guaranteed, the sheer novelty of the place**.**

The aim of museum education programs should be to engage students in learning by employing pedagogies that showcase the resources of the museum and make learning enjoyable, challenging, effective and memorable. As students are not in their usual learning environment, museum educators have the opportunity to introduce them to authentic primary sources they would not normally have access to in the classroom in order to engage them in learning. Active learning is generally considered to be any instructional method that requires students to engage in an active, physical response and to think about and discuss what they are doing.

The active learning activities most frequently used by educators in the ten programs were experiential/kinaesthetic learning and haptic learning and these are discussed below.

In 2004, Reading Museum undertook a ten-month evaluation in local schools, which concluded that seeing and handling real objects is an effective aid to learning and retaining information associated with the objects (Pye, 2007). Museum educator Madeline's comments remind us of the powerful effect of hands-on learning activities: 'Most of them love it. They love the fact that they are able to touch something, because in the museums a lot of the time you can't touch anything.' Educator Veronica said that artefact handling is a priority at her museum because it is 'learning by doing'.

Although artefact handling is an immediate and personal way of connecting students with the materiality of the past, simply handling an artefact for handling's sake does not necessarily result in learning. Objects are passive without some contextual information or some form of focus for handling sessions, especially if they are artefacts students have not experienced before (Pye, 2007).

The findings in this study demonstrate the vital role of the museum educator in working with students to guide them through the process of interrogating and interpreting artefacts.

6. Role-Play and Dress-Ups

Many programs provided role-play and dress-up activities, and even some of the older, 'too-cool-for-school' teenage boys participated. At one well-known open-air museum, the educators dress in period costume and, although they do not assume first-person character roles, are immediately able to grab students' attention because they are in period costume. One educator started his presentation with a very informal complaint about the discomforts of his costume and how different it was to wearing my normal clothes.

Programs were particularly effective when students also dressed up in historical costumes (for example hats, shawls, jackets) or assumed the roles of historical characters so that they could empathise with their life experiences.

Sharleen believes learning should be fun, and that dressing up in costumes of one way of getting students actively involved in learning:

> I think with chalk and talk it would go in one ear and out the other a lot, but with the dressing up I think they would remember and handling of the objects they remember a whole heap more and it's more enjoyable. They really want to be involved in whatever you're doing.

Conclusion

This research demonstrated that the educators in these Australian history museums were engaging with student visitors by actively teaching them, rather than leaving them to simply learn on their own by discovery. Museum educators used several well-known teaching strategies, such as historical inquiry, questioning, and kinaesthetic and haptic activities to engage students in learning.

This research shows that museum educators are central to the pedagogical process of teaching and learning in museums because they teach history explicitly through direct guidance by using a combination of dialogic interaction and active learning.

Kirschner, Sweller, and Clark (2006) reported that several reviews of empirical studies established a solid, research-based case against the use of instruction with minimal guidance. For example, they cite qualitative research by Aulls (2002) who found that, because students learned so little from a constructivist approach to learning, most teachers who attempt to implement unguided instruction ended up having to provide students with considerable scaffolding when students failed to make learning progress in a discovery setting. Aulls (2002, p. 533) reported that the teacher whose students achieved all their learning goals spent a great deal of time in instructional interactions with students by:

> simultaneously teaching content and scaffolding-relevant procedures … by (a) modeling procedures for identifying and self-checking important information…(b) showing students how to reduce that information to paraphrases … (c) having students use notes to construct collaborations and routines, and (d) promoting collaborative dialogue within problems.

Kirschner, Sweller, and Clark conclude: "The findings were unambiguous. Direct instruction involving considerable guidance, including examples, resulted in vastly more learning than discovery" (2002, p. 79).

The museum educators in this study communicated specific historical knowledge to students by interacting with them through dialogue—storytelling and questioning. Ideally this is delivered in digestible pieces consisting of synthesised detail, that also offer depth of understanding. The dialogue is peppered with questions that elicit responses about specific knowledge, determine whether students have understood the information and provide feedback that encourages student learning. A dialogue is established when students are prompted and encouraged to respond to questions and ask their own.

My observations of the pedagogies used by museum educators to directly guide students through the learning process is synthesised into the following six-step sequence:

1. The educator welcomes students, then contextualises the historical material in the museum or heritage site in space and time. This is done through dialogic interaction, often accompanied by an audio-visual presentation;
2. The educator uses questioning to determine prior knowledge and cognitive levels of students in order to tailor historical knowledge to their needs;
3. The educator gives clear instructions on logistics (grouping, pairing) and activities students will complete while they are in the museum and why they will do them;
4. Students participate in active learning activities. The educator assists, monitors progress, and answers students' questions;
5. The educator re-groups students who communicate their findings to the class. The educator uses questioning techniques to determine what students have discovered, concluded and interpreted. The educator gives feedback to students and elaborates on and clarifies information;
6. The educator summarises what students have learned and concludes learning activity.

This study demonstrates that museum educators in these Australian museums do not use a constructivist learning approach that leaves students to discover the museum by themselves.

Instead, museum educators used a variety of teaching strategies such as historical inquiry, dialogic interaction, and active learning to engage students in the process of historical thinking and learning. This finding challenges the dominant constructivist paradigm in museum education that focuses almost entirely on the learner and learning to the extent that the role of the museum educator as an active participant in the learning process has been largely ignored. By placing history educators in Australian museums at the centre of the inquiry, this research identified a considerable gap between museum education theory and the everyday praxis of teaching history in museums.

Since this research was undertaken there have been many innovations and developments, especially in the use of technologies for teaching and learning in museums. Digitisation is increasing visitors' access to knowledge: interactive pedagogies and augmented reality provide hyperreal experiences. The research in this study shows that human interaction has a powerful impact on learning when experienced educators use their pedagogical content knowledge of history in Australian museums to spark the flame of learning in students.

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