Exploring values through lived experiences of the World Heritage site of Petra: A case study

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Positioning ourselves in Petra

When I moved to Jordan in the Middle East at the beginning of 2013 to take up a two-year volunteer role in a local non-governmental organisation—Petra National Trust (PNT)—I had been working in science education as a teacher, teacher educator and researcher for almost a decade. At first glance, the links between being an education and youth engagement advisor for an organisation that advocated for the World Heritage site of Petra and my previous work did not seem at all obvious. But over time two clear connections emerged.

The first connection was in relation to the role and presence of science in my work. The phrase 'science is everywhere' can at times sound like a cliché but in the case of Petra it is very much true. The geological features, such as the narrow gorge that draws you into the site and the incredible coloured rocks, alongside the architectural achievements, realised as monuments carved into the sandstone, are what make Petra famous. While most people don't tend to think about these features through a scientific lens because the aesthetics are overwhelming, when you scratch below this rather beautiful surface you start to realise that a wide range of scientific principles and concepts played an important role in being able to convert notoriously harsh desert conditions into a fully functional, thriving city. This played out in a number of ways, including complex water harvesting techniques, using metallurgy to develop carving tools and sophisticated approaches to making ceramics. What I came to realise is that while I didn't necessarily form an instant association between Petra and science or my education-focused work in both spaces, I was very much experiencing science in ways that were applied and relevant, and that genuinely contributed to an improved way of life.

The second connection played out in the notion of privilege and whose values, or perspectives of what should be valued, are credited with mattering. This might seem quite abstract in terms of links with Petra, but over time it certainly struck a chord with me. I have found the tensions that play out between scientifically accepted ways of knowing phenomena and culturally specific ways of making sense of the world to have had a significant influence on my thinking. I have had opportunities to experience science learning and teaching in different parts of the world, including the Cook Islands, Nepal and India, which has caused me to be more attuned to the tendency for school science to be enacted in ways that privilege scientific approaches. In the context of Petra, this privilege is realised through the ways visitors to the site are prepared to engage with and make sense of their experience. This is usually through lenses provided by 'experts' such as international archaeologists and global organisations such as UNESCO (United Nations Educational, Scientific and Cultural Organization). The more time I spent with the local communities connected with Petra, the more I recognised that their ways of valuing and making sense of the site were markedly different, and

sometimes at odds, with what I had been educated to consider as important.

Angela

When I started working for PNT in 2014, my experience with Petra was limited to two visits I made to the site in 1997 and 2013, which were done with little understanding of the history of the place since efforts were underway to list it as a World Heritage Site. It was only after working at PNT that I learned of the various and sometimes conflicting interests held by the different stakeholders and how they impacted—or didn't—decisions pertaining to the management of a historical site like Petra, one that, though ancient, still remains home to a small community known as the Bdoul. I admit I had always given priority to the need to preserve the site in a manner consistent with standards set by UNESCO and heritage management best practices, but I soon began wondering why the positions and demands of external bodies were always given precedence over local needs, and why locally-held values were deemed less important than those that informed the World Heritage platform. If a community sees Petra as its home, should it not continue to be so even though the act of daily living might damage a historically valuable and arguably unique site. Why shouldn't sites like Petra remain living sites? Why should they be turned into museums? Perhaps the answer lies less with the power and influence of international bodies like UNESCO than with the Jordanian authority's inability to desist from patronising its citizens rather than actively including them in the decision-making processes.

Diana

This chapter seeks to probe the complexities inherent in the notion of values by positioning this work within the context of our experiences and knowledge of the tensions that play out at the UNESCO World Heritage site of Petra situated in Jordan. Petra becomes a case study of sorts with the voices of various stakeholders at this site becoming the informants in what these tensions are and what impact they have (see Dillon & Reid and Roche & Murphy, this volume, for other context-rich chapters). Parallels can be drawn to the tensions that play out between scientifically-accepted ways of understanding and valuing science phenomena and more culturally specific ways of making sense of and connecting with the world. Connections will be made to highlight what this means for the work and thinking of science educators.

Science and Petra: Where are the links?

At first glance, the links between scientific understandings and practices and the World Heritage site of Petra may seem tenuous. That the S in UNESCO stands for 'scientific' is a clue. The more obvious link, however, is that Petra is a classic site for archaeological research and discoveries. While there is some debate about whether archaeology should be defined as fitting into the traditions of history or science, it is more broadly understood to be a bridge between these two ways of making sense of the world. Archaeology draws upon a range of evidence and techniques to study human activity. This focus may be of interest to science educators and their students as it brings a contemporary understanding of the work of scientists. It showcases that science can exist outside of the traditional paradigms often enacted in schools—biology, chemistry, physics, and earth and space science. Archaeology draws on the conceptual and theoretical ideas existing in these strands and uses them in applied ways to make discoveries and solve problems out in the world.

Beyond being of archaeological interest, Petra can also be considered as science rich through its impressive geological and hydrological features. Geologically, the site is famed as the '*Rose Red City'* for its various hues of red sandstone. Sandstone

rates as a 6-7 on the Mohs scale of hardness, which ranges from 1 (talc) to 10 (diamond). This suggests that while the rock is durable, it is possible for it to be shaped and moulded. The geological structure of Petra proved to an ideal canvas for carving elaborate features and facades. The red colour is caused by the presence of iron oxide in the rock, which results in reddish tints ranging from pink to terracotta. Across the site, it is also noted that the sandstone has yellow and purple features caused by the presence of feldspar and manganese respectively. Hydrologically, the site achieved an incredible feat of sustaining a significant population in desert conditions. This was through sophisticated water harvesting techniques such as the use of dams and cisterns and a system of channels to store and transport water around the site. To maintain the quality of the water for human consumption, terracotta pipes were created. These features were engineered to make use of the mountainous catchment areas as well as the natural slope of particularly the Siq, the naturally occurring narrow gorge that provides a protected entry point to the main city area. Evidence suggests that Petra was so abundant with water that it was possible the city had water features, such as waterfalls and ornamental moats.

Petra is not the only science-rich site in this region. Other UNESCO World Heritage listed locations in the Middle East that highlight the application of scientific understandings and practices include the Pyramids in Egypt, the irrigation systems in northern Oman and the Socotra Archipelago off the coast of Yemen. In fact, of the 1073 listed sites located across world, most have some scientific underpinnings or connections. Of all of these sites, 832 are identified as cultural, 206 as natural and 35 as mixed properties. Although a science-rich site, Petra falls into the cultural designation alongside other sites such as the Sydney Opera House (Australia), the Great Wall (China), the Taj Mahal (India) and Stonehenge (United Kingdom). While a place of interest to scientists, particularly archaeologists, the main group of people visiting Petra is tourists who tend to be intrigued and mesmerised by the cultural, historical and aesthetic aspects of the site. However, we should not lose sight of the potential that a science-rich site such as this offers. It provides evidence that scientific phenomena are based on real things and have an application to what is happening (or has happened) in the world. It is a type of authenticity that is highly valued in science education and has the capacity to engage the hearts and minds of science teachers and learners alike.

Positioning Petra and our work

The ancient city of Petra served as the capital of the Nabataean kingdom (4th century BCE–107CE), which extended through southern parts of modern-day Jordan, Palestine and north-western Saudi Arabia. Today, the remains of ancient Petra are part of the Petra Archaeological Park (PAP) and are surrounded by six communities with a total population of approximately 19,000 (Hashemite Kingdom of Jordan, 2015).[1] Petra is Jordan's most popular tourist site and receives hundreds of thousands of visitors each year. Consequently, tourism and related services are the region's main avenue for economic growth and its main employer apart from the public sector. After peaking at almost one million visitors in 2010, the number of visitors to Petra has since decreased significantly, with 410,000 in 2015 and 464,000 in 2016 (Petra Development and Tourism Regional Authority, 2016). Visitor numbers are highly sensitive to external events, both regional and global. The shrinking of tourist numbers since 2010 is related to the ongoing political and humanitarian crisis in neighbouring Syria, which has negatively impacted the tourism sector nationally

[1] The PDTRA, however, puts the population of the Petra region at approximately 31,000; see http://www.pdtra.gov.jo/page.aspx?page_key=key_people.

and regionally. Conversely, following the World Heritage designation in 1985, visits that year more than doubled and when Petra became one the new Seven Wonders of the World in 2007 in a global competition, numbers increased by 50% the following year.

Management of Petra has been a source of some regional strife over the years. Competing interests and conflicting disputes over land rights and access by the former Bedouin dwellers of the site have created an atmosphere of mistrust and, sometimes, outright antagonism (Farajat, 2012; Ma'ayeh, 2010). Other concerns about its management have had to do with the prioritisation of development and investment over preservation of the site and in contradiction with sound cultural heritage practice. Petra's designation as a UNESCO World Heritage site in 1985 led to a dramatic increase in visitors, which elicited concern about dangers posed by heavy human traffic. It was this concern over potential threats to the ancient site as well as concerns over poor management that led to the establishment of the Petra National Trust (PNT), an Amman-based non-governmental organisation, in 1989 (and where the authors worked twenty-five years later). PNT initially limited itself to advocacy and monitoring through "promot[ion] and coordinat[ion of] Jordanian and international efforts to preserve the unique combination of antiquities, natural environment and human traditions in the Petra region" (Petra National Trust, n.d.). Through various archaeological and preservation projects carried out over the years under PNT's aegis, by securing funding and enlisting the efforts of archaeologists, engineers and local and national authorities, Petra is now a safer and better understood site (Petra National Trust, n.d.). PNT has also monitored decisions made by the various managing authorities, most recently the PDTRA, to ensure that they were aligned with best practices and World Heritage expectations.

Beginning in 2010, PNT supplemented its role as an advocacy and watchdog agency by branching into youth awareness and outreach programs. It is this renewed vision that brought both of us (the authors) to the organisation with Angela in a voluntary capacity as an education and youth engagement advisor in 2013 and 2014, while Diana was the Director of Education, Outreach and Awareness from 2014 to 2015. Buoyed by the idea that Petra's local community was the archaeological site's best advocate, PNT developed popular and successful youth engagement programs aimed at raising awareness among children (from ages 7 to 18) of

> the *cultural and natural value* of Petra by underscoring the inextricable link between good practices in cultural heritage management and long-term economic gains… PNT's programs *aim to instil those values that render Petra a World Heritage site* and the importance of its preservation for the benefit for [sic] the community, Jordan and the world at large. (Petra National Trust, n.d.)

As we can see here and by the organisation's own admission, PNT's education focus is guided by the values that have rendered Petra an UNESCO World Heritage site.

Inscribing values: The role and vision of UNESCO

UNESCO was established in 1945 as one of the arms of the newly established United Nations, which was created in the aftermath of the Second World War. UNESCO seeks to promote mutual understanding among member nations by promoting international collaboration on educational, scientific and cultural initiatives as a means toward ensuring world peace and avoiding future armed conflict. In 1972, UNESCO adopted the Convention Concerning the Protection of World Cultural and Natural Heritage, and created the World Heritage Fund to assist member states in identifying, preserving and promoting World Heritage sites with the intent of getting those sites inscribed onto the World Heritage list (Keough, 2011; UNESCO, 2008).

Inscription onto the list results when a state that is party to the World Heritage Convention submits an exhaustive file on the merits of the site in question, pushing forward the case that the site—whether cultural or natural—is indeed worthy of special status as a heritage site that can be considered part of the world's patrimony. For a successful submission to be made, a site must possess what UNESCO calls "Outstanding Universal Value" (OUV), which is acknowledged if the site fulfils at least one of the ten criteria that may render it as having such value (UNESCO, 2008). As mentioned previously, Jordan succeeded in placing Petra on the World Heritage list in 1985, and did so by demonstrating how the site - both the ancient monuments and its natural habitat - possesses the following characteristics (numbers correspond to the position of each criterion in the list):

> i. Represent[s] a masterpiece of human creative genius
> iii. Bear[s] a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared
> iv. [Is] an outstanding example of a type of building, architectural or technological ensemble or landscape, which illustrates (a) significant stage(s) in human history. (World Heritage Convention, 1985)

It is worth noting that in the context of this book, these OUVs could be linked to values that are considered relevant and meaningful to science and science education in the forms of creativity (i), human endeavour (iii) and innovation (iv), respectively.

As one can see from the list above, the criteria are rather vague and broad, prompting one scholar to wonder how it is that every historical or culturally significant site in the world has not already made it onto the list (Shepherd, 2006). The 1972 Convention defines cultural heritage sites as "works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view" (UNESCO, 1972). In her critique of the World Heritage program, Keough (2011), quoting Boer, notes that even the definition of "outstanding universal value" as it appears in the Operational Guidelines of the World Heritage Committee—"cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity" (p. 601)—does not clarify things much further. With no qualifications for what "exceptional" or "importance" are meant to signify, except that they are universally so, Keough explains that this vagueness gives the World Heritage committee member states (there are currently 21) "incredible latitude… in choosing which sites are suitable for inclusion" (p. 602). She also says, "As a practical matter, this leaves open an equally incredible opportunity for misuse of this latitude, as there are no sequential criteria that a site must pass through on the journey to inscription" (p. 602). Nations are free to choose which sites are worthy of nomination, and there is no official UNESCO body that is mandated with that duty.

Furthermore, the notion of heritage and how it is acknowledged, appreciated, and valued in the way that UNESCO does, is very much a modern (Western) construct. De Cesari (2010) describes how "[a]t the intersection of nationalism and colonialism, a concept of heritage developed between the nineteenth and the twentieth centuries as the shared past of the nation-state, along with the infrastructure required to manage it" (p. 305). The concept of "world heritage," she continues, took shape as something that needed protection from the "disruptive effects of modernization," namely the unprecedented levels of physical, economic, cultural and human destruction that two successive world wars wreaked upon the European continent. De Cesari cites other cultural heritage scholars who are critical of the UNESCO World Heritage system, calling it "a case of Western imperialism because Western languages, values and practices of the past, genealogically related to the nationalist and capitalist projects (Gamboni, 2001), are subtly imposed at a global level as best

standard practices" (p. 306). These critiques suggest a call for action in terms of finding and documenting different ways of valuing World Heritage by showcasing the perspectives of the stakeholders themselves.

Grassroots values: Perceptions from the local community

We consider ourselves as 'inside outsiders' to this story. Our work has involved us advocating for Petra through a significant education, outreach and awareness programme focused on the children and young people living in the six communities surrounding the site. While much of that work has been guided by UNESCO's perspectives of how the Petra site should be valued, for this chapter we feel that it is important to take a step back from this association and to capture the perspectives of those more directly connected with the site through their lives and work. In the spirit of breaking through the layers of politics and privilege that exist to capture the lived experience, we are enabling a number of stakeholders to speak for themselves to give voice to the values that they associate with and ascribe to Petra.

In achieving this, five conversations were held around the key question, *what value does Petra have to you*? The five people who contributed to these discussions have various connections and interactions with the site and were either been born in the Petra region or had lived in one of the communities for a significant amount of time (over 15 years). In brief, these individuals were:

- *Abdullah* – shop owner (souvenirs), located at the entrance to the site;
- *Hisham* – tour guide for the Petra site and regional attractions;
- *Hani* – manager of a hotel positioned close to the Petra site;
- *Amira* – principal of a primary school located in one of the communities; and
- *Ahmed* – works with Tourist Services and Protocol for the Petra Development and Tourism and Regional Authority (governmental body).

Each conversation is captured in the following snapshots and is intended to highlight the perceptions of five individuals, who have a lived experience of Petra, by emphasising the values they identify with or place on the site.

Abdullah: Weighing up historical value against dollars

To Abdullah, a shop owner, Petra is of historical and economic importance. "Its historical value means a lot to us, for the people here, Petra means a lot. It [also] means a source of income." In capturing the historical importance of the site, he used words like "civilisation" (*hadara*) and "existence" (*wujud*), which suggests a significant and ongoing connection. The following quote captures how the historical value of Petra means more to Abdullah than its economic potential:

> It's more than a source of income, and maybe, what can be more important to a human being than a source of income?

Equally, the historical value that he places on the site is underpinned by a deep emotional connection:

> For example, many visitors who come, and especially Arabs, they are the people who affect us the most. That person who, when he returns [from visiting the Petra site], says to you, I'm never coming back. Petra, it's just a bunch of stones!

Abdullah shares a sense of being "annoyed that these people don't value me, [and] the region's history and civilization". Interestingly, he believes that visitors to the Petra site from outside the Arab nations seem to value the site more than local visitors.

Hisham: Beauty and culture go hand-in-hand

Hisham, a tour guide, connects with Petra on a historical and aesthetic level. Initially, in the conversation, he focused on the historic worth of the site.

> Its value is great for those who understand its historical value. Petra has a long history, which goes back more than 2,500 years, when the Nabataean Arabs first settled it.

However, Hisham goes on to express adamantly the aesthetic importance of the site:

> Whoever goes to Petra is dazzled … with its wonderful colours. In addition to its aesthetic value stemming from the colours, there is the aesthetic value of the rock carvings.

For him, these two values are interlinked in that you cannot truly connect with the aesthetic elements of Petra if you don't understand the site from a historical perspective. The following quote helps to illustrate this viewpoint.

> One day, for instance, there was this Arab man who wanted to visit Petra but he found the entrance ticket too expensive. He said, I don't want to see Petra. Why should I go see a bunch of rocks? Of course, this person knows nothing, he thinks it's a bunch of stones. A lot of visitors come and don't hire a tour guide; they visit and look and don't know/understand anything. That's why we encourage [visitors] to hire tour guides so that they learn about Petra's history. If you don't know the history of place, you won't enjoy it.

As a counterbalance, Hisham admitted that as a boy and even as a young man, before becoming a tour guide and having to learn about Petra's history in detail, "we'd look at the rocks and we wouldn't know what it all meant." He also touched on an interesting point—"Petra came in second place in the New Wonders of the World competition in 2007"—which provides insights into the value of the site in terms of increasing the profile of the region as a place to visit as a tourist, which has economic overtones.

Hani: Local, national, international

Like Hisham, Hani, a hotel manager, connected with Petra on historic and aesthetic levels. Both of these factors are at play in his use of the term "unique" which he used several times to describe the site:

> It's something distinguished, not only unique. Distinguished. I mean, the wow-factor once you reach the end of the Siq, and you see the greatness of the Treasury, it is something that I would not exchange it with money of x, y, z. Petra is unique, yes.

Through the conversation, Hani went on to highlight the role that local people have in maintaining this uniqueness and the factors that are threatening this. "Petra has a lot to offer, but we have to upkeep Petra. There are certain things that need to be somehow eliminated in order for Petra to be able to give as long as we live." For him, the upkeep of Petra isn't about spending money to restore or fix things, but about changing attitudes and expectations of local people to ensure the longevity of the values of the site as well as long-term economic sustainability.

> This is what we have been taught and learned over the years. Values differ according to, maybe to [one's] own benefit, let's say. And I always say, people of Petra, yes they do value but not the way, but they don't give Petra the real value.

Hani's comments get at the tensions that exist between the historical and aesthetic aspects of Petra that essentially bring people to the site and the economic values, which sustain the livelihoods of the local people. His insights have been gathered through his contact with international guests visiting the site. To Hani, the profile of Petra as a New Wonder of the World again highlighted the tension between a tourist versus local view of the site. For tourists, it is about valuing the historic and aesthetic aspects of Petra, while for some locals it is about the economic benefits that flow from an increase in tourist numbers:

> It means something to them in terms of it is a money factory-destination. They generate revenues out of it.

He was acutely aware of the repercussions of these things on how people may then represent Petra, the country and the region when they go home. For Hani, the value that Petra gives to the country and its people is much more than economic, it is about reputation and in many ways Petra becomes the spotlight that shines a light on this for better or worse.

> I value it for what's giving; for what Petra is giving to Jordan. I mean, people would, maybe they would not know Jordan unless they know Petra. Or they come to Petra to experience Jordan, and sometimes it's the other way around; they come to Jordan to experience Petra. So Petra is something unique. Unique in culture, unique in destination, unique in place, unique in everything.

Amira: Beauty amongst the instability

Amira, a school principal, valued Petra historically, economically and aesthetically. Similarly to Hani, she held an awareness of what the site meant not only locally, but at an international level because of the "ancient cultural heritage" of the site. Amira identified that "this heritage calls upon us, young and old, to preserve it and hold onto it". Somewhat different to the others, she held a bigger picture insight of the economic value of the tourism that Petra attracts as a "source of income, let's say, for Jordan or one of the Jordanian economic channels" rather than for individuals per se.

For Amira, Petra had been a key influence in the "recovery/resurgence of the Jordanian economy because it was able to attract so many foreign tourists" even though the instability of the region has reduced the numbers coming to the site. "The reason is not Petra itself, or Jordan; it might in fact be due to the Arab Spring and the effect it had on the whole Arab world". Emotions also have an underlying role in the ways she believed people value the Petra site because despite the unrest and uncertainty active in the area "Petra still carries this special place in all our hearts". This is an interesting comment considering Amira had only visited Petra once. Despite this, she was very clear in differentiating her visit to Petra from when a tourist (essentially an international guest) visits the site.

> Look, a tourist comes to Jordan, truly, I mean, he hears about Petra and he comes to enjoy Petra and to discover what this cultural heritage is that everyone enjoys. Indeed, the tourist [is able to] enjoy Petra. As for me, I went as a visitor, not for enjoyment—the first kind of visit (e.g., tourism) is for enjoyment—I went on an exploratory visit.

Amira has lived in one of the communities surrounding Petra for 16 years. She has noticed that when she mentions that she lives near Petra, this conjures up images of "generosity, quality, history, something ancient" from the others living outside the region. The beauty of the site was not lost on Amira, but she had not returned because she has children and she feels that "when you want to admire beautiful scenery, when you want to enjoy/experience things as a tourist, it's best not to bring your children with you because they really hinder your movement". Regardless, Amira had a way to poetically articulate how beautiful the site was despite her lack of experience in engaging with the site directly, which is many ways seemed spiritual in nature.

> When you go to Petra you want to enjoy it because it contains [within it] the meaning of sublimity, beauty and grandeur. All of this is embodied in Petra, and if you really want to enjoy it you shouldn't take children with you.

Ahmed: Respect and pride

Cultural components are what connect Ahmed, the Head of Tourist Services and Protocol, to Petra. He exuded a sense of being very fortunate to have a site such as Petra in his country and part of his cultural heritage. For Ahmed, in thinking about the site in this way, it seems "priceless" and above being just about how it is valued or what its values are. Interestingly, he talked about his connection with Petra as being a "relationship" being borne out of "respect". It seemed that the site has given Ahmed the opportunity to not only share his culture, but to learn a great deal about cultures from all over the world without needing to leave the region.

> It's because of Petra that [people of] different cultures from far away places, from all over the world, pass through either Taybeh or Wadi Musa, two of the six communities around Petra, it's because of their visits to Petra that I was able to get to know these various cultures. Now, these cultures have their positives and negatives, and based on what one can acquire from [these encounters], it's either positive or negative.

Ahmed held a sense of pride about the site and his ability to provide tourists with a good experience. This was captured in an example he shared about enabling visitors with special needs easy access to the site, so thinking about what their needs were and finding solutions to some of the issues they faced (e.g., difficult terrain and long distances if using a wheelchair, etc.). This pride was also sensed in Ahmed's understanding of the international reputation of the site through being recognised as a New Wonder of the World, a place that the King of Jordan draws attention to and that other agencies want to be connected with.

> This means that it is an honour to be here, in this place that is important to every eye that has seen it, every ear that has heard [about] it, and everyone who has visited it.

'More than just stones': What these narratives tell us

What emerged from these conversations in response to the question—*what value does Petra have to you?*—was a convergence around three key values as identified by these community members in relation to the Petra site: historical/cultural, economic and aesthetic. While these values will not be explored in detail, they will instead be juxtaposed against the values UNESCO ascribes to the Petra site, with comparisons made between the stakeholders' ways of expressing the value of this site to local people and ways a Western organisation articulates what matters.

Over 2000 years ago the Petra site started to take the shape that it is famous for today and in doing so became a key location for rest, renewal, commerce and trade on the camel caravan trails crisscrossing the deserts of the Middle East. As the snapshots above capture, Petra remains a place of refuge for quiet reflection, for escape, for wonder and awe, and for being reminded of cultural and historical connections. Arguably commerce and trade also still exist in the form of tourism. The creativity, human endeavour and innovation that made Petra what it is, as named by the OUVs ascribed by UNESCO, make the site a tourist drawcard to the region in its own right. With close to a million people visiting the site at its peak, the desire to experience Petra has not been without its pitfalls, with short-term economic gains and long-term preservation goals often at odds with each other. The snapshots above give voice to members of the local community and start to get at these tensions. A range of points emerge from these conversations, but for this collection two particular messages are considered in more detail in relation to the nature and role of values more generally and specifically with links to science education: perceived value and balance.

The designation given by an international organisation, like UNESCO, has a significant influence on how something is valued on the global stage. Petra is a case

in point with visitor numbers doubling within a year of being inscribed on the UNESCO World Heritage list. Interestingly, this doesn't register with stakeholders in the same way as experiencing success in a commercial popular contest (naming the New 7 Wonders of the World) did. This labelling of status is juxtaposed against the significant differences in how international tourists regard the Petra site in comparison to regional Arab visitors. What we sense is coming to the fore is the role of perceived value and the complexities that exist when we think we should value something in a particular way because others tell us that it is important or that it matters. This is perhaps most evident in the narratives, and becomes increasingly complex, when notions of identity and connectedness start to get tangled up with the economic value of Petra for both local communities and Jordan more generally. The snapshots captured in this chapter speak to the messiness of a values-based approach to understanding a site such as Petra because what matters plays out differently in relation to need.

The notion of perceived value can play out in relation to science when we consider the divide that can exist between scientifically-accepted ways of making sense of the world and other more culturally-derived ways of understanding. Equally this notion may play out when weighing up problems and considering where scientific resources (human and material) would be best used. For example, should priority be given to solving developing world issues (e.g., eradicating malaria) over more first-world issues (e.g., obesity)? Both of these scenarios start to raise questions about whose values should be prioritised in these circumstances and why. Coming to a definitive answer is not easy and perhaps not even necessary. Recognising that it is not about prioritising whose values matter more starts to become important alongside acknowledging the validity in different ways of valuing knowledge and its application.

It has become evident to us as this chapter has unfolded that there are more similarities between the ways that Petra is valued internationally and locally than there are differences. Notions of cultural importance and aesthetic qualities are similar threads running through the snapshots we have shared and our documented understandings of how UNESCO values this World Heritage site. However, it seems that the differences lie in the reality of how the site is lived and experienced by the various stakeholders. In particular, the role and contribution of economics to Petra, in terms of livelihoods both locally and nationally, is where some key differences and even tensions lie. It is important to note that these things aside, whether internationally positioned (big picture) or locally connected (little picture), both parties have valid ways of valuing Petra. Viewing the site in this way brings opportunities to strike a better balance by creating a more holistic and inclusive approach to considering what matters and why.

The notion of striking a balance between values systems in science may not always be appropriate or achievable, but it does provide a pause for thought in terms of weighing up different ways of connecting with the world. It proves to be particularly useful when grappling with contentious issues (e.g., the use of uranium as a sustainable energy solution). Using a different lens can help us to be mindful of possibilities and to make more informed decisions about the science we encounter. But like our discovery regarding the values connected with Petra, there are possibly more similarities in the values systems embedded in the science community than there are differences. Despite differences in opinions and perspectives, the values connected with creativity, human endeavour and innovation—three important components underpinning science practice and thought—and their connection to scientific understandings and knowledge are typically unwavering.

Concluding thoughts

This chapter may not connect cleanly with science education, but what we have tried to achieve through sharing these snapshots is to explore the values that emerge from lived experiences of a science-rich site. By positioning this against the values held by an international organisation like UNESCO, we were highlighting where tensions might exist in terms of the values associated with the Petra and how, and whose, values might be privileged. What this chapter does offer science education is an opportunity to consider what we think about values in terms of how they may play out in lived experience (rather than in theory or on paper) and what multiple and diverse perspectives can do to provide more nuanced understandings. By considering values in action in this way, it is possible to engage in more open dialogue around the importance of values and to promote thinking about the role context plays in making meaning.

This chapter also offers science educators with an authentic case study that highlights two key considerations that can be integrated into science learning experiences. Firstly, it provides insights into a real world example of how science can be applied to help make sense of the world, in this case, through archaeology and all that it has uncovered about the science concepts and practices at play in Petra. And secondly, through raising awareness of the tensions that can exist between different stakeholders and their value sets, this work provides a contentious issue for discussion: by visiting a World Heritage site like Petra, are we helping or hindering the preservation and protection of this science-rich location?

In the end, whose values matter when it comes to Petra? Our work highlighted three characteristics that UNESCO ascribed to Petra, which are largely cultural values. We also made connections with three values that are important in the science community—creativity, human endeavour and innovation—all of which have relevance to what has been achieved at this site over time. Through discussion with local stakeholders, we discovered three common values that are important to the people of Petra—historical/cultural, economic and aesthetic. Through our own grappling with the inherent complexities, we recognised a number of overlapping similarities in the values that stakeholders connect with this site. For example, the beauty of Petra was captured in expressions such as creative masterpiece, innovation and aesthetics. Where differences did exist, and this was mainly in the name of economics, they did tend to drive a wedge between stakeholders and the values they connected with Petra.

This work highlighted for us that a site like Petra will naturally mean different things to different people. While there will be core values that will act to bring stakeholders together, the challenge will exist in being able to find respectful ways to balance out the differences.

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References

de Cesari, C. (2010). World Heritage and mosaic universalism: A view from Palestine. *Journal of Social Anthropology, 10*, 299–324.

Farajat, S. (2012). The participation of local communities in the tourism industry at Petra. In D. C. Comer (Ed.), *Tourism and archaeological heritage management in Petra: Driver to development or destruction* (pp. 145–165). New York: Springer-Verlag.

Gamboni, D. (2001). World heritage: Shield or target. *The Getty Conservation Institute Newsletter, 16*(2), 5–11.

Hashemite Kingdom of Jordan Population and Social Statistics Directorate, Department of Population Statistics. (2015). *The population of the Kingdom by Administrative Divisions, according to the General Census of Population and Housing Result 2015*. Retrieved from http://census.dos.gov.jo/wp-content/uploads/sites/2/2016/04/No_of_pop_depand_on_GOV.pdf

Keough, E. B. (2011). Heritage in peril: A critique of UNESCO's World Heritage Program. *Washington Global Studies Law Review*, *10*(3). Retrieved from https://openscholarship.wustl.edu/law_globalstudies/vol10/iss3/5/

Ma'ayeh, S. (2010, March 22). Jordan's bedouins consider returning to caves. *The National*. Retrieved from http://www.thenational.ae/news/world/middle-east/jordans-bedouins-consider-returning-to-caves#full

Petra National Trust. (n.d.). *Petra National Trust*. Retrieved from http://petranationaltrust.org /

Petra Development and Tourism Regional Authority. (2016). *Petra visitors statistics 2000–2016*. Retrieved from http://visitpetra.jo/DetailsPage/VisitPetra/StatisticsDetailsEn.aspx?PID=5

Shepherd, R. (2006). UNESCO and the politics of cultural heritage in Tibet. *Journal of Contemporary Asia*, 36(2), 243–257.

UNESCO. (2008). *World heritage information kit*. Retrieved from http://whc.unesco.org/en/activities/567/

UNESCO. (1972*). Convention Concerning the Protection of the World Cultural and Natural Heritage*. Retrieved from http://whc.unesco.org/en/conventiontext/

World Heritage Convention. (1985). *Petra webpage*. Retrieved from http://whc.unesco.org/en/list/326