



DIGITISING DIORAMAS

Technology and planning help museums manage outdated exhibitions.

By Claire Browning, Heinz R  ther, Stephen Wessels and Wendy Black.

Museum exhibitions are all about the 'Wow!', 'What?' and 'Why?' as they showcase beauty and wonder, spark curiosity, and share some of the important lessons museum scientists have learnt through detailed study of these objects.

But what happens when exhibitions no longer reflect our current understanding of how life on Earth evolved? Science advances all the time and new discoveries are constantly being made. At what point should older exhibitions be dismantled – and what should they be replaced with, given how rapidly knowledge is moving?

These are questions we've recently had to mull at the Iziko South African Museum in Cape Town. As curators and members of the museum's Research and Exhibitions team, we had to decide on the future of an iconic exhibition that first opened in 1959. It was the first diorama-style exhibition in South Africa that showcased the fossil discoveries made in the country's Karoo region. Dioramas are three-dimensional scenes with models and a painted backdrop.

The Boonstra Dioramas were named for Dr Lieuwe Dirk Boonstra, a curator and researcher at the South African Museum who dedicated his life to understanding the mysteries of ancient pre-mammalian relatives that looked a lot like modern-day reptiles and dinosaurs, but are actually much older. The dioramas he and his colleagues created represented the best available scientific knowledge about how extinct plants and animals interacted with each other and the Karoo ecosystem around 270 million years ago.

Building on the efforts of science education pioneers like Boonstra, modern scientists now have an even better

understanding of Karoo fossils. That has rendered many of the models in the Boonstra Dioramas scientifically inaccurate. But should it remain as a testament to its place in history, to teach us about the process of knowledge generation and the evolution of scientific discovery, or be dismantled to maintain a scientifically accurate and relevant museum?

Museums around the world have been grappling with the issue of diorama removal. Some museums have opted to remove these old dioramas; the Smithsonian National Museum of Natural History in the US has, since 2003, substituted old animal displays with more scientific and modern exhibitions (often digital) emphasising what is currently known of their evolution.

We decided to remove the dioramas. But they're not lost forever. Thanks to technological advances, we've been able to preserve the exhibition digitally. We can do the same with other soon-to-be-retired museum exhibitions – and



make space for more up-to-date exhibitions that reflect the best-available science.

A big moving job

Before we could turn the dioramas over to technological wizards, we had to decide which objects from the Boonstra Dioramas should be archived for perpetuity and what to do with objects that didn't make the cut.

A careful de-installation plan was negotiated between museum professionals and building contractors, who oversaw the physical de-installation process. Most of the models were built in place and were too big to fit through the museum doors. As with most dioramas that are only ever viewed from the front, the wall-facing sides of the models didn't need to be complete.

Many of the wall-facing sides in the Boonstra Diorama models showed a grotesque mesh of wire and plaster that would make it difficult to display them in future historical exhibitions without extensive conservation efforts. Most of these larger models had to be dismantled on site and removed in pieces. Models that were small enough to fit through the door were carefully removed intact.

We were able to salvage and carefully relocate a few scientifically accurate models. Most of the real fossils (not models or casts) could be carried back into the collections by hand, with one exception. The *Bradysaurus*, a kind of Pareiasaur, was a remarkably complete showcase fossil that had been built into the display. To our surprise, we found this fossil was encased in concrete. Today, plaster of Paris, which is much lighter and less brittle than concrete, is used to consolidate the rocks surrounding fossils in the field and to protect the encased fossil during transport to the museum.

Thanks to 10 strong construction workers and a customised movable dolly, the *Bradysaurus* specimen was safely removed. It is now in the museum's behind-the-scenes collection, accessible to researchers for further study.

Some of the painted backdrops, separated into panels, have found new homes at regional museums. Others will be temporarily housed at Iziko South African Museum until suitable homes can be found.

With the exhibition space cleared, a large blank canvas remains. It will be used for a new permanent exhibition on human evolution, a collaboration between Iziko's



A Zamani Project team member in action, digitising fossil replicas using a 3D laser scanner.



Sibiso Mthungata, a technical assistant, prepares the *Bradysaurus* fossil for transport.



The *Bradysaurus* is displayed in the diorama as it may have appeared shortly before fossilisation within layers of hardened mud and clay.


Archaeology Unit and the Human Evolution Research Institute at the University of Cape Town.


A digital approach

Several digital technologies have recently emerged to help preserve brick-and-mortar exhibitions. These include lidar (3D laser scanning) and photogrammetry to create high-resolution, colour 3D models that are accurate digital replicas.


The cost of digital preservation, and particularly lidar scanning, is often prohibitive for publicly funded museums. Iziko partnered with the Zamani Project, a non-profit heritage documentation organisation based at the University of Cape Town. Through this collaborative effort the Boonstra Dioramas, including the exquisitely painted backdrops, are now digitally archived.

A 360-degree panoramic tour is available online, allowing visitors an immersive experience of the dioramas. This is a valuable way for museums to connect with a wide range of visitors in a virtual environment during the global COVID-19 pandemic and hopefully beyond. There are also plans to create augmented and virtual reality applications from the digitised exhibition. Additionally, the digital models could be 3D printed to create scaled-down versions of the fossil models.

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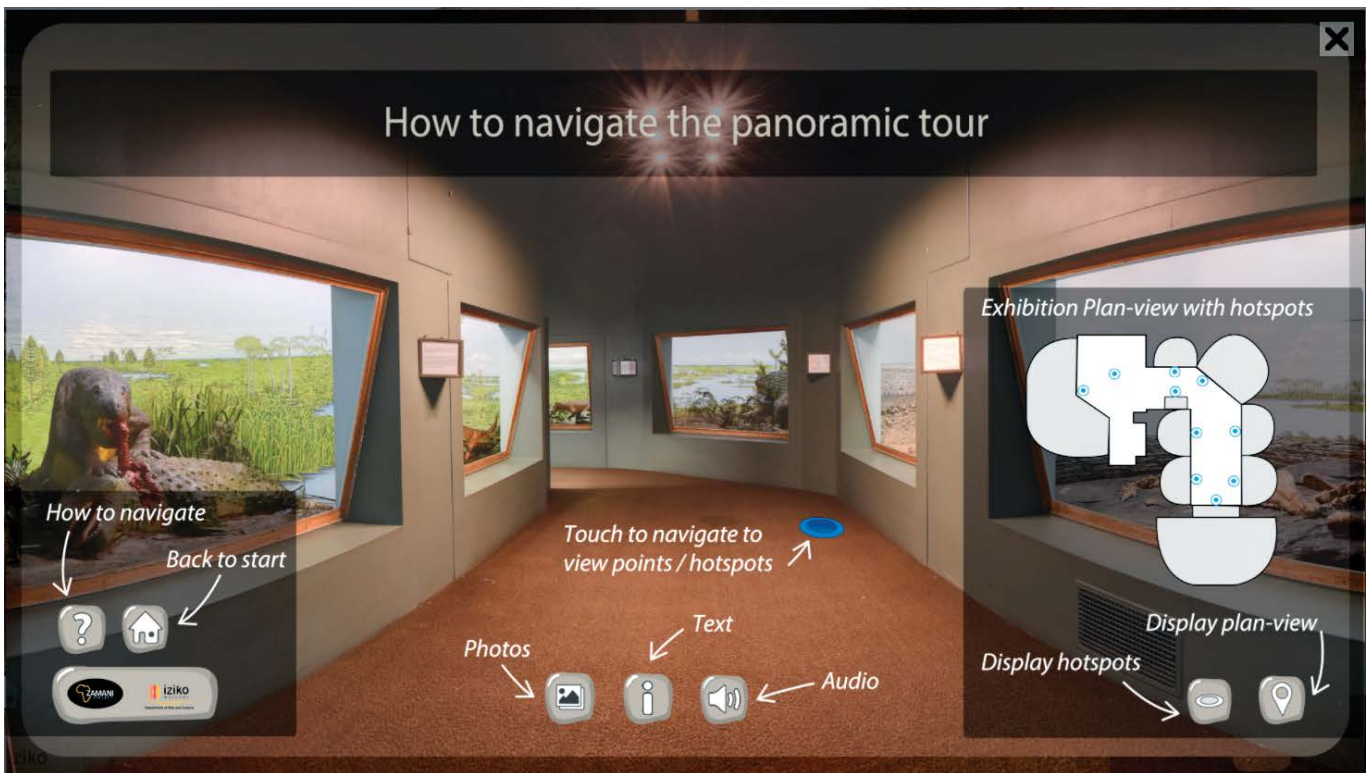
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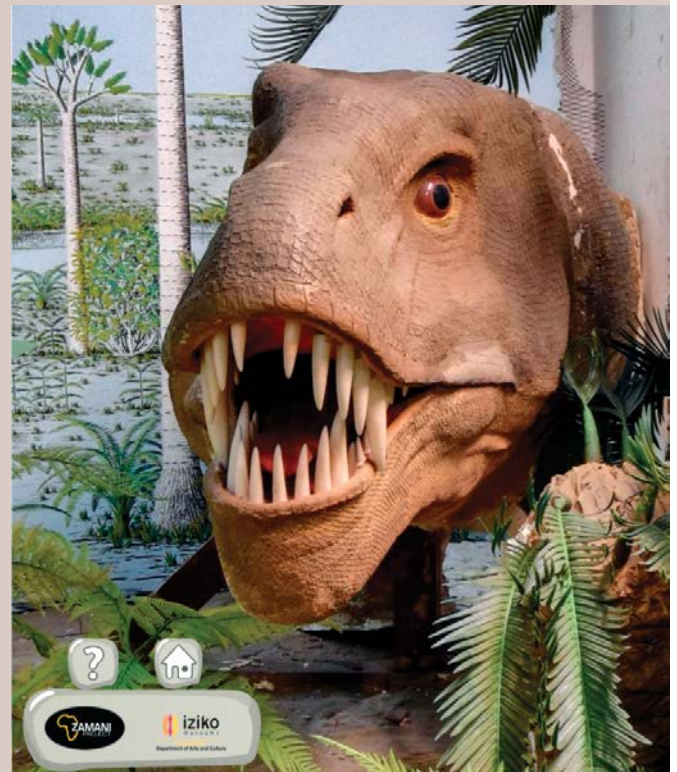
<https://theconversation.com/technology-and-planning-help-museums-manage-outdated-exhibitions-143852>



On 18 September, Claire Browning presented an online seminar on the Boonstra Diorama Digital Reconstruction Project for the Geological Society of South Africa. During her presentation, she gave a demonstration of the 3D panoramic tour, which allows viewers to zoom in on the models and pan around from a number of different positions, including some from inside the display cases. This means that viewers can in some instances see more of the dioramas than visitors to the museum could in the past, from behind the glass windows.

Viewers have the option of reading text from the original information panels, or listening to it, and they can also access a set of photos showing details of each diorama's backdrop. Claire explained that preserving the exquisitely painted backdrops was something she felt passionate about, so she had photographed these herself using a Hasselblad medium-format camera for archival quality images.

Apart from being available online, the panoramic tour has been installed on a touchscreen next to the *Bradysaurus*



model and fossil, which have been relocated to another part of the museum's exhibits. The future plans to create a virtual reality application from the digitised dioramas would allow visitors to have an immersive experience, wandering amongst the ancient animals of the Karoo, while 3D printing would allow visitors to print a souvenir of their favourite diorama model.

- View the panoramic tour at: <https://boonstra360panoramas.zamaniproject.org/>