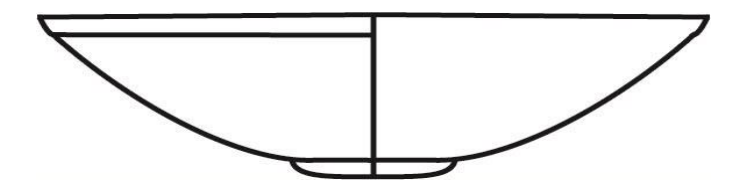


The Use of New Technologies to Display Pottery Sherds in the Museum Setting



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Introduction

- 3D modelling and printing can be used to provide a better understanding of the complete vessels that pottery sherds came from
- 3D modelling and printing in a museum setting allows for the creation of physical replicas of otherwise inaccessible objects.
- A deeper connection can be made with the museum visitor by making use of this new technology

Objectives

- To develop a technique of digitally reconstructing pottery vessels to be used in various aspects of museum and educational environments

Methods

- NextEngine's 3D scanner Ultra HD was used to scan individual sherds.
- The sherds were then used as a reference to digitally recreate the artefact with Autodesk's Fusion 360 software version 2018.
- The laser scanned sherd was used to cut the sherd location from the model.
- The resulting models were sectioned into appropriate sizes for printing.
- Two 3D printers were used; the Makerbot Replicator and the Ultimaker 2+ .
- The original sherd was then joined with the 3D printed vessel to provide visitors with a complete understanding of the artifact that the sherd originated from.
- The 3D models were also incorporated into an interactive display using Intuilab's Intuiface version 6.1.7 that allowed museum visitors to interact with and manipulate the models.

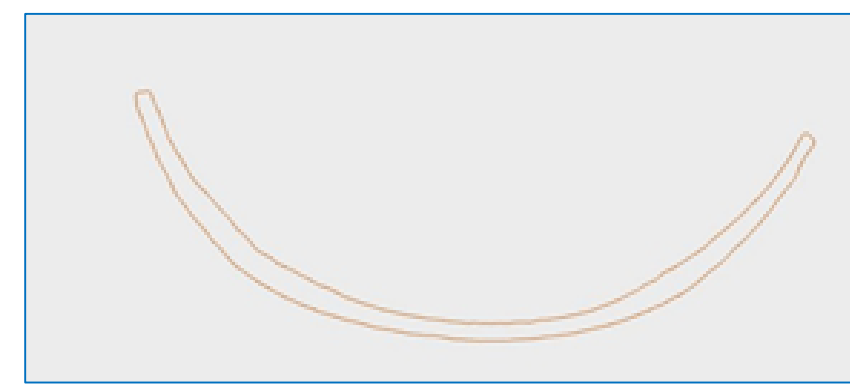
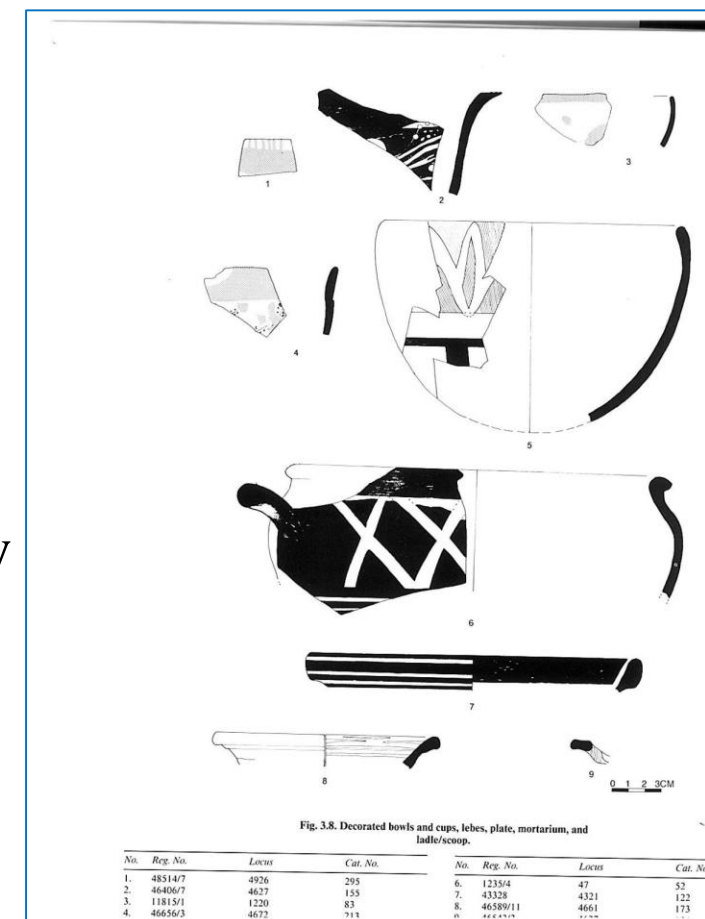


Figure 1 & 2: Hellenistic Bowl sherd cross section (Above). Pottery Drawing reference¹ for Hellenistic Bowl (Left).



Reference pottery drawings were scanned and imported into Fusion 360 to be used as direct references in the modelling process.

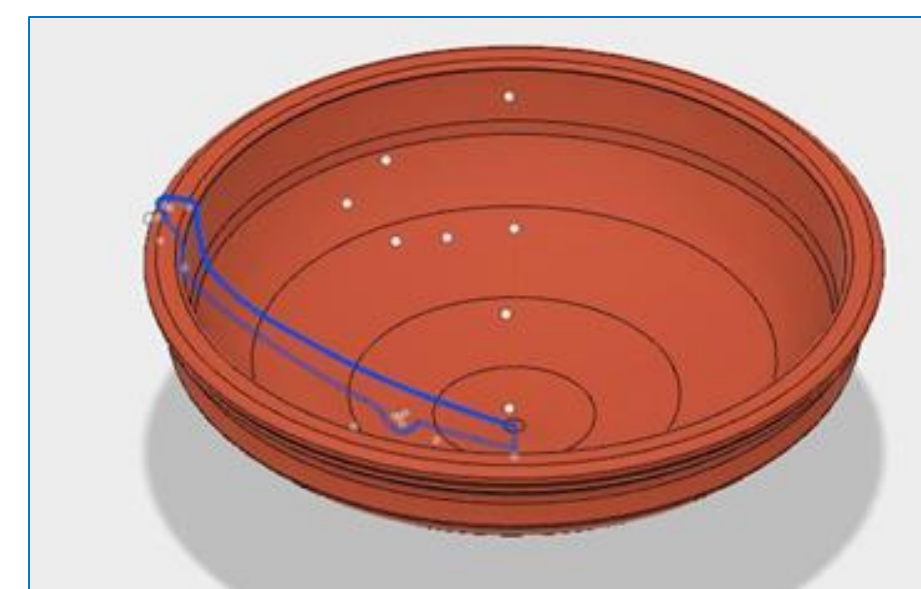


Figure 3 & 4: Iron Age Bowl with Profile (Left). 3D printed IA bowl with original sherd

The profile of the to-be-reconstructed vessel is then traced using the sketch tool (blue line in fig 3), and then the vessel created using the revolve tool (fig 3).



Figure 5, 6, & 7: 3D modelled Persian Period Mortaria with laser scanned original sherd (Left). 3D printed Persian Period Mortaria with original sherd (Middle), Section of a vessel being 3D printed on an Ultimaker 2+ (Right)

The laser scanned model of the reference sherd is then used to cut a hole in the complete model.

The 3D models created were also included in an app that accompanied the 3D printed reconstructions. The app allowed for full interaction with the 3D models, as well as more information regarding each vessel model within the app.

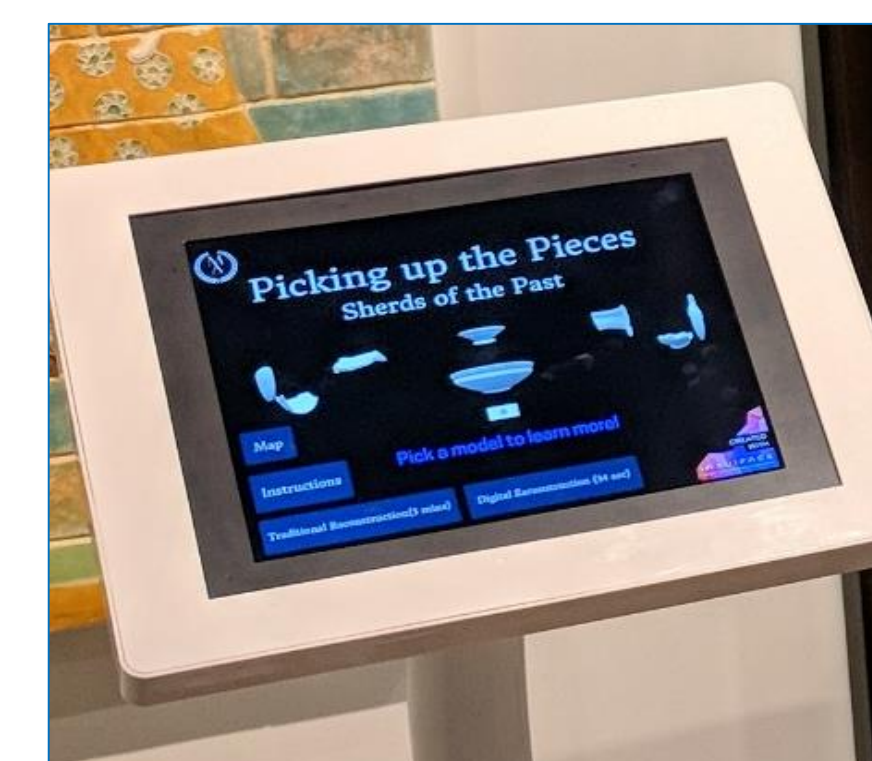


Figure 8: Main Screen of the Intuiface App developed

Discussion

- Limited research has been previously undertaken in making 3D modelling and reconstruction inexpensive, accessible, and accurate.
- The skill, artistry, and cost of traditional pottery reconstruction makes it impractical for many smaller museums. With this new technique, pottery reconstruction can become more accessible, even without a 3D printer, as digital models can be displayed on tablets, and tvs.

Conclusion

- The process of recreating ancient vessels digitally and physically allowed for comprehensive display of the ceramics represented in a fragmentary collection.
- The visitor experience was greatly enhanced through the use of 3D Printing, 3D pottery reconstruction, and the interactive digital display.
- Using new technologies provided visitors with knowledge of complex topics in an easy to understand manner and promoted education for minimal cost.

References

1. Amiran, Ruth. 1970 *Ancient Pottery of the Holy Land: From Its Beginnings in the Neolithic Period to the End of the Iron Age*. Rutgers University Press.
2. Gitin, Seymour ed. 2015 *Ancient Pottery of Israel and its Neighbours from the Iron Age through the Hellenistic Period*. Israel Exploration Society

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