



HAL
open science

A dissemination experiment centered on the scientific analysis of a cat mummy

Ronan Gaugne, Théophile Nicolas, Jérémy Lacoche, Fabrice Guichard, Odile Hays, Valérie Gouranton

► To cite this version:

Ronan Gaugne, Théophile Nicolas, Jérémy Lacoche, Fabrice Guichard, Odile Hays, et al.. A dissemination experiment centered on the scientific analysis of a cat mummy. 6th International Conference on Innovation in Art Research and Technology, InART2024, Jun 2024, Oslo, Norway. hal-04846761

HAL Id: hal-04846761

<https://hal.science/hal-04846761v1>

Submitted on 18 Dec 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Public Domain

A dissemination experiment centered on the scientific analysis of a cat mummy

¹ R. Gaugne, ² T. Nicolas, ³ J.Lacoche, ⁴ F. Guichard, ⁵ O. Hays, ¹V. Gouranton

¹ Univ Rennes, Inria, CNRS, IRISA

² Inrap, UMR 8215 Trajectoires

³ Orange Innovation

⁴ Polymorph 3D

⁵ Musée des Beaux Arts de Rennes

Keywords: Museum mediation, Virtual Reality, Non-destructive analysis, 3D data

Abstract

This work presents the design and evaluation of a dissemination experience aimed at enhancing the scientific study of a cat mummy. The resulting dissemination environment relies primarily on a virtual reality (VR) experience and complex 3D printing techniques. The mummy belongs to the archaeological collection of the Musée des Beaux-Arts in Rennes, France. This project was carried out after a study conducted by the University of Manchester on around 800 animal mummies which saw that around a third of them were empty [1]. The project led to various discoveries about the mummy [2] and produced a large amount of digital data collected by X-ray, tomodesitometry and photogrammetry. This data was processed for use in various augmented reality, VR and 3D printing productions, first to support the scientific analysis of the mummy, and then to disseminate the findings to the public. The originality of the dissemination approach lies in the choice to highlight the scientific process that led to new knowledge and new unresolved questions, rather than presenting the conclusions in a historical perspective. The project produced two main media. First, the 3D data obtained from processing the scanner data was used to produce a transparent 3D print on a 1:1 scale (Fig. 1). This technique was already proposed as a means of safeguarding the internal spatial organization of archaeological material [3]. This copy of the mummy allows the public to discover its different internal elements. It is now part of the museum's permanent collection, displayed alongside the real mummy. Then, a virtual reality environment, called Secret of Bastet (Fig.2), was set-up and presented to visitors to offer an interactive, educational and entertaining experience. The application was designed and produced as part of a collaboration between the museum team, a computer science laboratory, an archaeology laboratory, a VR research team from the international private company Orange Innovation and the graphics studio Polymorph 3D. The experience takes users through the production, exploration and analysis of the data and guides them in its interpretation by counting the number of cat specimens present in the moment by identifying and counting bones of the same type. After a first presentation during an international professional event in 2023, the Bastet experience was presented at the museum during weekly dissemination events. During these presentations, two user studies were carried out using subjective questionnaires to collect and analyze user feedback. The first study focused on the quality of the VR experience in terms of presence, usability and comfort. Thirteen users responded to the questionnaire. The second study examined the impact of the dissemination experience. Seventy people responded to the questionnaire. Both studies received positive and enthusiastic feedback. The results show that users are genuinely interested in discovering and experiencing the scientific approach. The two media offer complementary experiences. The 3D printing gives access to a vast amount of information, ""invisible"" on the original artefact. The VR environment proposes a more active experience through a scripted story and interactions with the mummy that are usually inaccessible. User studies carried out during exhibitions of the VR experience validate the interest of the approach from the public.



Fig. 1. The transparent 3D printed copy of the mummy cat



Fig. 2. The VR application "Secret of Bastet" used inside the archaeological room of the Museum

References

- [1] McKnight, L.M., Atherton-Woolham, S.D. & David, A.R. 2011. The Ancient Egyptian Animal Bio Bank at the KNH Centre for Biomedical Egyptology, University of Manchester. *Antiquity*, 85, p.329.
- [2] Gagne, R., Porcier, S., Nicolas, T., Coulon, F., Hays, O., & Gouranton, V. (2018). A digital introspection of a mummy cat. In 3rd Digital Heritage International Congress, IEEE.
- [3] Nicolas, T., Gagne, R., Tavernier, C., Gouranton, V., & Arnaldi, B. (2016). Internal 3D printing of intricate structures. In *Digital Heritage International Conference, EuroMed, Proceedings*, (pp. 432-441). Springer International Publishing.