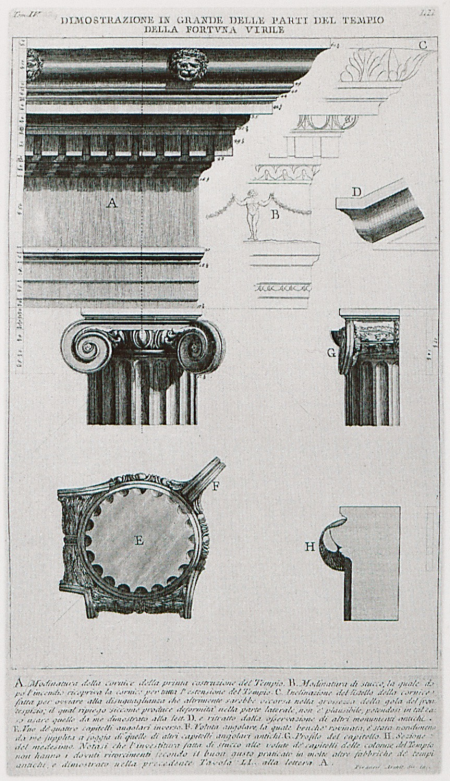
IV. Presentation

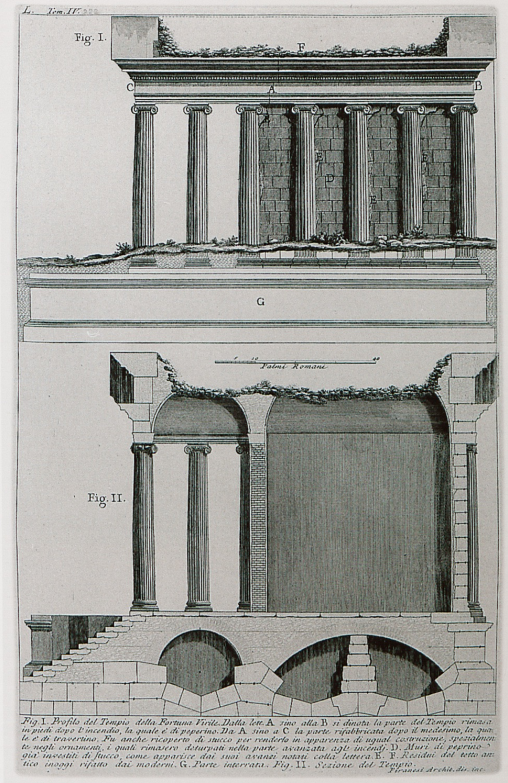
11. Reconstruction, Simulation and Virtual Reality

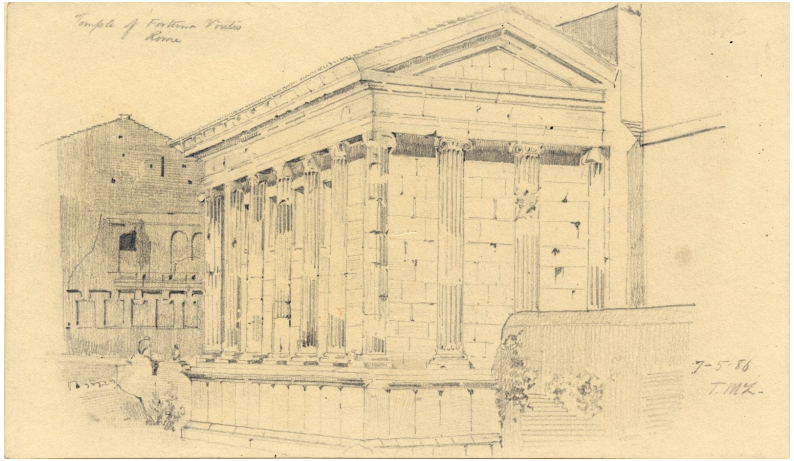
Prof. Dr. Martin Langner

Schreibman / Siemens / Unsworth (2016) Ch. 8; Jannidis / Kohle / Rehbein (2017) Ch. 22; Münster, Sander / Pfarr-Harfst, Mieke / Kuroczynski, Piotr / Ioannides, Marinos (Hg.), 3D Research Challenges in Cultural Heritage II. How to Manage Data and Knowledge Related to Interpretative Digital 3D Reconstructions of Cultural Heritage. Berlin / Heidelberg 2016.

GRAPHIC DOCUMENTATION OF WHAT IS PRESERVED







Drawing by Thomas MacLaren (1863–1928):
https://cudl.colorado.edu/luna/servlet/detail/UCBOULDERCB1~36~36~197239~111082:Temple-of-Fortuna-Virilis,-Rome

Giovanni Battista Piranesi, La Antichità Romane opera di Giambattista Piranesi architetto veneziano divisa in quattro tomi…, vol. IV, Rome, Angelo Rotilj, MDCCLVII [=1757].

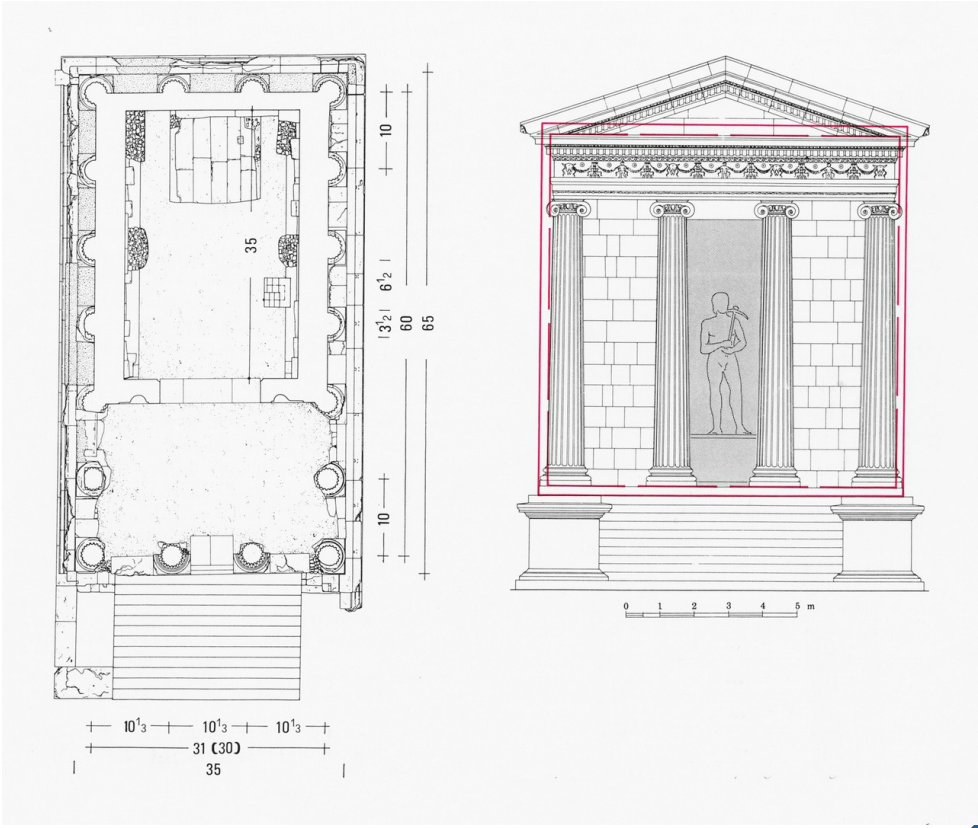
SECTIONS, EXTERIOR VIEWS AND FLOOR PLANS

- Function and structure of a building

- Checking reconstructions for plausibility

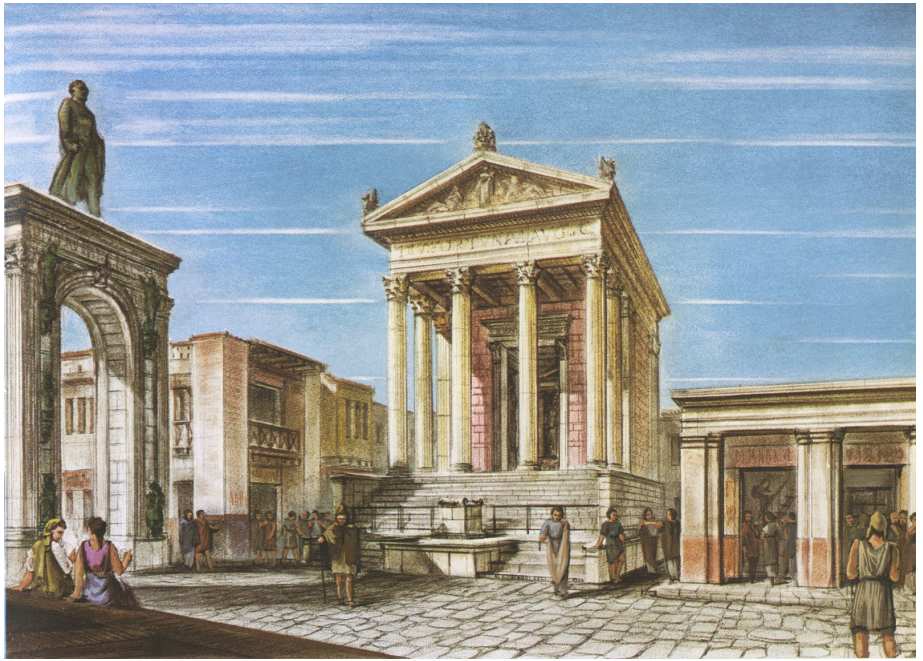
- Visualisation of interrelationships and proportions

- also three-dimensional and interactive



Mark Wilson Jones, Principles of Roman Architecture (New Haven / London 2000) 65 Abb. 3.26-3.27

DRAWING RECONSTRUCTION



A. De Franciscos, I. Bragantini, Pompeii, Herculaneum and Capri. Past & Present

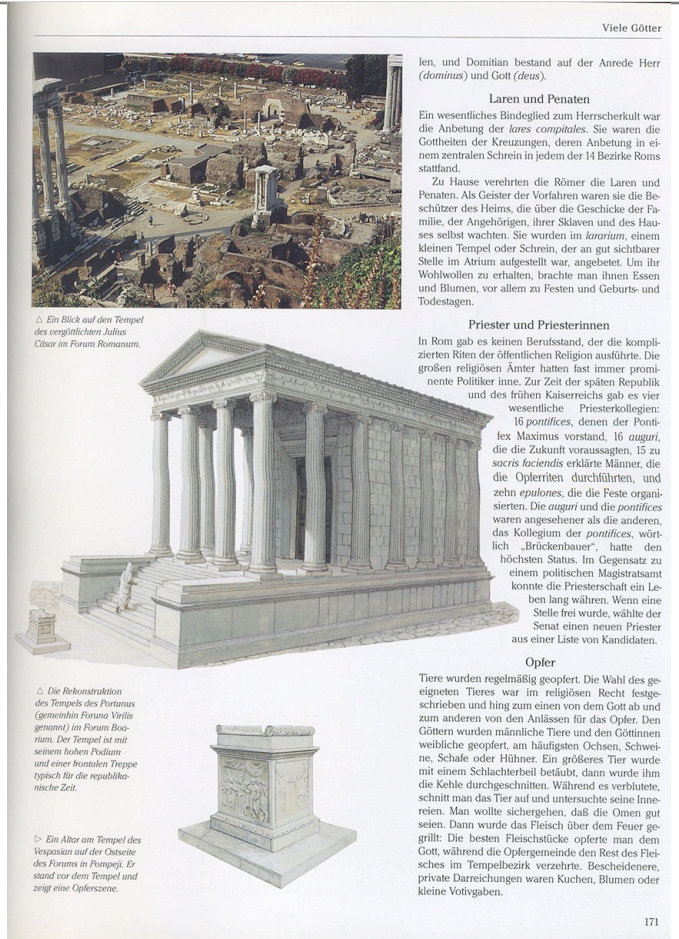
GRAPHIC ILLUSION

(INTERAKTIVE) EXPLANATORY GRAPHICS

- for the school or museum sector

- for the vivid communication of factual knowledge

http://romereborn.frischerconsulting.com
http://www.gearthblog.com/blog/archives/2008/11/ancient_rome_in_3d_for_google_earth.html



Viele Götter

len, und Domitian bestand auf der Anrede Herr (*dominus*) und Gott (*deus*).

Laren und Penaten

Ein wesentliches Bindeglied zum Herrscherkult war die Anbetung der *lares compitales*. Sie waren die Gottheiten der Kreuzungen, deren Anbetung in einem zentralen Schrein in jedem der 14 Bezirke Roms stattfand.

Zu Hause verehrten die Römer die Laren und Penaten. Als Geister der Vorfahren waren sie die Beschützer des Heims, die über die Geschicke der Familie, der Angehörigen, ihrer Sklaven und des Hauses selbst wachten. Sie wurden im *lararium*, einem kleinen Tempel oder Schrein, der an gut sichtbarer Stelle im Atrium aufgestellt war, angebetet. Um ihr Wohlwollen zu erhalten, brachte man ihnen Essen und Blumen, vor allem zu Festen und Geburts- und Todestagen.

△ *Ein Blick auf den Tempel des vergöttlichten Julius Cäsar im Forum Romanum.*

Priester und Priesterinnen

In Rom gab es keinen Berufsstand, der die komplizierten Riten der öffentlichen Religion ausführte. Die großen religiösen Ämter hatten fast immer prominente Politiker inne. Zur Zeit der späten Republik und des frühen Kaiserreichs gab es vier wesentliche Priesterkollegien: 16 *pontifices*, denen der Pontifex Maximus vorstand, 16 *auguri*, die die Zukunft voraussagten, 15 zu *sacris faciendis* erklärte Männer, die die Opferriten durchführten, und zehn *epulones*, die die Feste organisierten. Die *auguri* und die *pontifices* waren angesehener als die anderen, das Kollegium der *pontifices*, wörtlich „Brückenbauer", hatte den höchsten Status. Im Gegensatz zu einem politischen Magistratsamt konnte die Priesterschaft ein Leben lang währen. Wenn eine Stelle frei wurde, wählte der Senat einen neuen Priester aus einer Liste von Kandidaten.

△ *Die Rekonstruktion des Tempels des Portunus (gemeinhin Fortuna Virilis genannt) im Forum Boarium. Der Tempel ist mit seinem hohen Podium und einer frontalen Treppe typisch für die republikanische Zeit.*

Opfer

Tiere wurden regelmäßig geopfert. Die Wahl des geeigneten Tieres war im religiösen Recht festgeschrieben und hing zum einen von dem Gott ab und zum anderen von den Anlässen für das Opfer. Den Göttern wurden männliche Tiere und den Göttinnen weibliche geopfert, am häufigsten Ochsen, Schweine, Schafe oder Hühner. Ein größeres Tier wurde mit einem Schlachterbeil betäubt, dann wurde ihm die Kehle durchgeschnitten. Während es verblutete, schnitt man das Tier auf und untersuchte seine Innereien. Man wollte sichergehen, daß die Omen gut seien. Dann wurde das Fleisch über dem Feuer gegrillt: Die besten Fleischstücke opferte man dem Gott, während die Opfergemeinde den Rest des Fleisches im Tempelbezirk verzehrte. Bescheidenere, private Darreichungen waren Kuchen, Blumen oder kleine Votivgaben.

▷ *Ein Altar am Tempel des Vespasian auf der Ostseite des Forums in Pompeji. Er stand vor dem Tempel und zeigt eine Opferszene.*

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VIRTUAL PANORAMAS

- Panoramic view from a fixed point of view

- Panoramas are also suitable for CD-ROM and internet-based presentations.

Yadegar Asisi, Panorama of Rome 312 AD

(VIRTUAL) OBJECT PANORAMAS / EXHIBITS

The object being viewed is in the centre of the viewer's gaze. He can move freely around the object and view it from all sides.

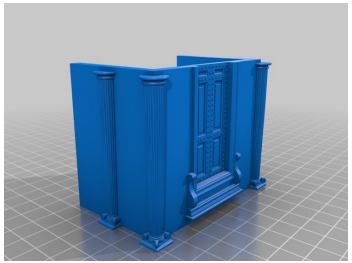
Wonders of the Ancient World: François Fouquet's Model Masterpieces" exhibit at the Sir John Soane's Museum from July 15 until September 24, 2011

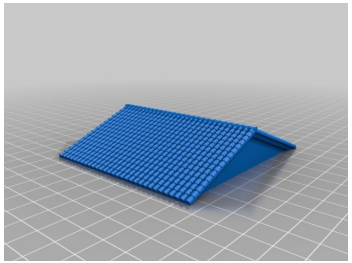
DIGITAL CONSTRUCTION OF MODELS

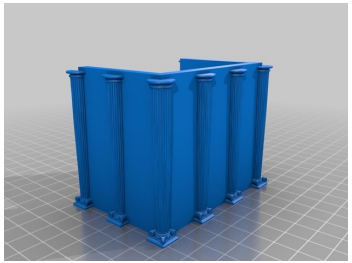
- Multiplicability

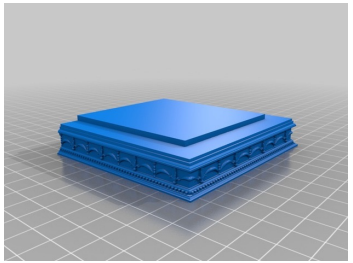
- scientific comparison

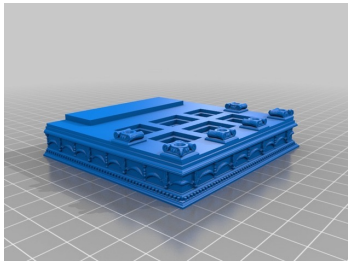
- Constant, replicable and flexible with regard to corrections and extensions











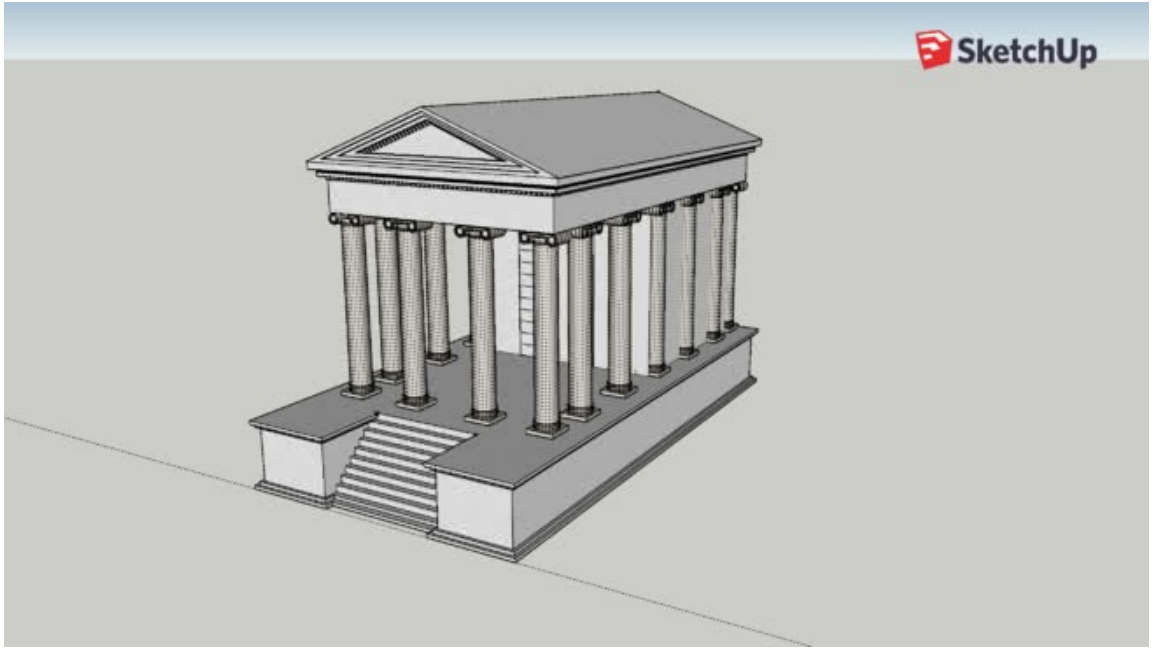
https://www.thingiverse.com/thing:2650801

PHYSICAL RECONSTRUCTION (RESTORATION)

PIRANESI, Giovanni Battista. La Antichità Romane opera di Giambattista Piranesi architetto veneziano divisa in quattro tomi…, vol. IV, Rome, Angelo Rotilj, MDCCLVII [=1757].

CAD (COMPUTER AIDED DESIGN) MODEL

The topographies of terrain models and exact building constructions are mostly created with precise CAD programmes



https://3dwarehouse.sketchup.com/model/edbbe931-1bd5-4c15-98c1-3f041a266eaa/Temple-of-Fortuna-Virilis-Portunus

3D MODELLING

The modelling of irregular and organically shaped bodies, as well as the design of surface, light and movement is done with special 3D animation programs (such as blender).

REAL-TIME 3D APPLICATIONS

Computer games and 3D levels that can be explored virtually

https://www.fondazioneaquileia.it/de/aquileia-3d

SIMULATIONS

- Plausibility of reconstructions
- Optional solution models

GAMES

- Teaching in an unobtrusive, entertaining and playful way.
- Methodically and didactically valuable preparation of the scientific content

www.romereborn.org

AUGMENTED REALITY APPLICATIONS

http://electricarchaeology.ca/2015/05/20/low-friction-augmented-reality

Exactness **Complete Illusion**

- Drawing documentation of the existing building
  - Sections, exterior views and floor plans
- (Interactive) explanatory graphics
  - Virtual panoramas
  - Object panoramas / models / exhibits
- Digital modelling
- Physical reconstruction (restoration)
  - CAD (Computer Aided Design) Model - Games
  - 3D modelling with animation software - Drawing illusion
  - 3D real-time applications - Simulations
- Augmented Reality Application

1. VIRTUAL REALITY

VR Environments

Technologies and Fields of Application

2. STRATEGIES, METHODS AND STANDARDS OF DIGITAL IMPLEMENTATION

Implementation

Aims and Methods

Visualisation of Uncertainty

Research Sources

Documentation

3. EXAMPLES OF DIGITAL MODELLING OF SPACE AND TIME

Virtual museums: History

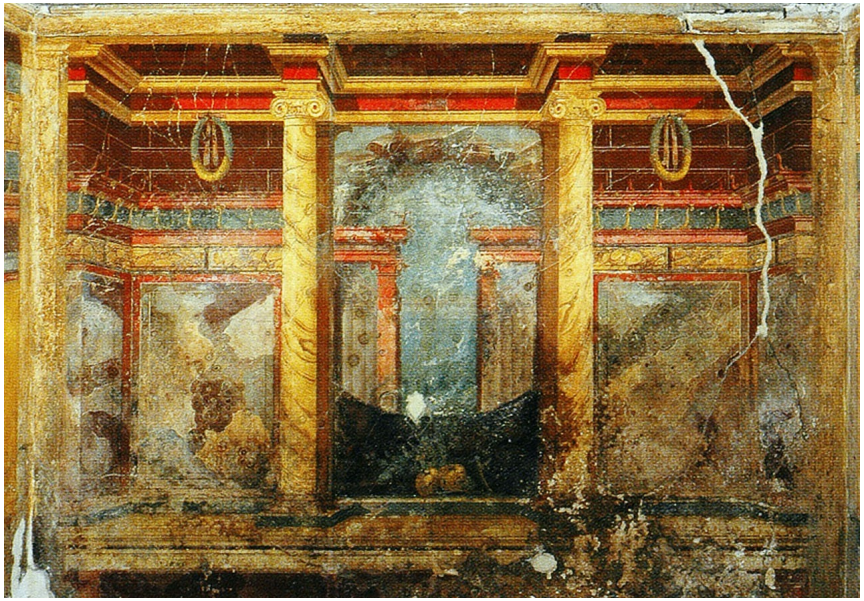
4D Reconstruction (Ename / Belgium)

Reconstruction from the 3D printer

VIRTUAL REALITY

VIRTUAL REALITY

http://archpro.lbg.ac.at/austria-carnuntum/carnuntum-roman-urban-landscape



Villa of Oplontis, Middle of 1st cent. AD

Marinos Ioannides u.a. (Eds.), Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection, 8th International Conference, EuroMed 2020, Virtual Event, November 2–5, 2020, Revised Selected Papers (Heidelberg: Springer, 2021).

„Virtual Reality“

Virtual reality (VR) refers to an **immersive, computer-simulated reality** that creates a physical environment **that does not exist** and is independent of the user's current physical reality.

Users are transported into a computer-generated, interactive 3D environment that they perceive in real time and that seems real to them.

https://www.fondazioneaquileia.it/de/aquileia-3d

VR ENVIRONMENTS

Virtual environments can acquire the user's head movement and respond to it with appropriate visualisations in real time, further enhancing the impression of reality.

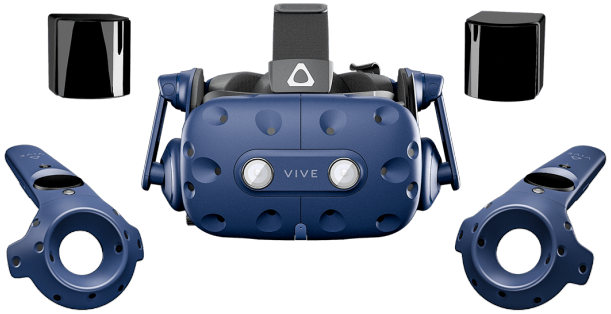
https://timeride.de/dresden/

OUTPUT DEVICES:

- Large screens

- CAVE (Cave Automatic Virtual Environment)

- Head-mounted display (Video or VR glasses)



http://datarama.mmg.mpg.de

PLAUSIBILITY AND INTERAKTIVITY

The interaction in the virtual world should be consistent and coherent.

- the user's actions have an influence on the virtual environment

- the events in the environment stimulate the senses of the user

This double interactivity creates the illusion of real events.

https://www.youtube.com/watch?v=XjswgkRavb4

Mel Slater, Place Illusion and Plausibility Can Lead to Realistic Behaviour in Immersive Virtual Environment, Philosophical Transactions Royal Soc London B Biol Science 364, 2009, 3549–3557 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2781884/)

FORMS OF INTERACTION

- physical movement through the virtual world

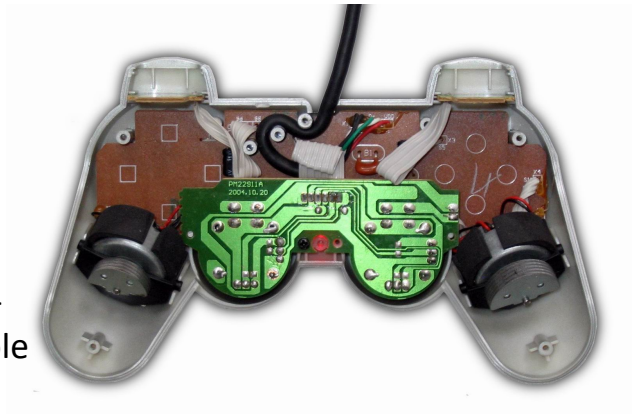
- special input devices such as a 3D mouse, data glove or omnidirectional treadmill that can be used to touch, move and manipulate objects.

https://upload.wikimedia.org/wikipedia/commons/c/c1/Cyberith_Virtualizer.JPG

FIDELITY

If the virtual world reproduces characteristics of a natural world, it appears credible to the user.

Force feedback on the hands or other parts of the body (force feedback) creates realistic simulations in the three-dimensional world through haptics and sensorics as a further sensory sensation.



Opened game-pad with rumble motors

IMMERSION

= Embedding the user in the virtual world by reducing self-perception in the real world.

Vision of the future: The holodeck of the Star Trek series as a "space that can create any environment audiovisually, haptically and [...] also olfactorily and gustatorily".

Jens Schröter, Das Holodeck. Phantasma des ultimativen Displays, in: Nina Rogotzki u.a. (Hrsg.), Faszinierend! STAR TREK und die Wissenschaften I (Kiel: Verlag Ludwig 2003) 105–130.

William Riker (Jonathan Frakes) betritt eine Holodeck Simulation.

https://vignette.wikia.nocookie.net/memoryalpha/images/e/eb/Riker_Jungle_Holodeck_2364.jpg/revision/latest/scale-to-width-down/1000?cb=20120425001847&path-prefix=en

LEVELS OF IMMERSION

player: influences VR via a predefined game character.

avatar: possesses a representative of himself in virtual reality, but without merging his identity with it.

character: the user identifies with the avatar and speaks about it in the first person.

persona: is a part of the user's identity. He does not play a character in a virtual world, he is himself in it.

Richard A. Bartle, Designing Virtual Worlds (New Riders, Indianapolis 2004), 154–158

PROBLEMS

Immersion in virtual reality is not without problems for humans:

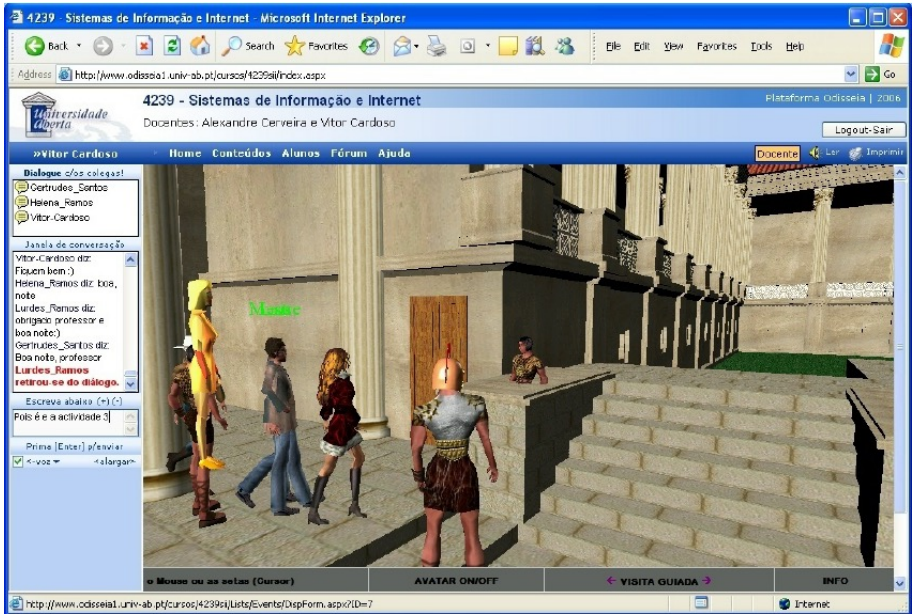
When artificial and actual movement and acceleration diverge, dizziness (motion sickness) occurs.

It can also be difficult and time-consuming to return to normal reality and to find one's way around again.

„Cyberspace“

= Internet-based 3D infrastructures (so-called Web3D).

If several users move in a common virtual environment, a cyberspace is created that overcomes spatial distance.



Vitor Cardoso, New roles for synchronous communication in on-line education: the Odisseia model for site structure integration, in: ISEP & Microsoft (Hrsg.), Proceedings of the First International Conference of Innovative Views of .NET Technologies (Porto 2005) 121–132.

„Augmented Reality“

extends the user's physical reality, which they see directly or on a display in front of them, with computer-generated input such as still images, audio or videos.

No new reality is created, but the computer-generated content lies as an overlay on top of the real content. However, the two environments have no way of communicating or reacting to each other.

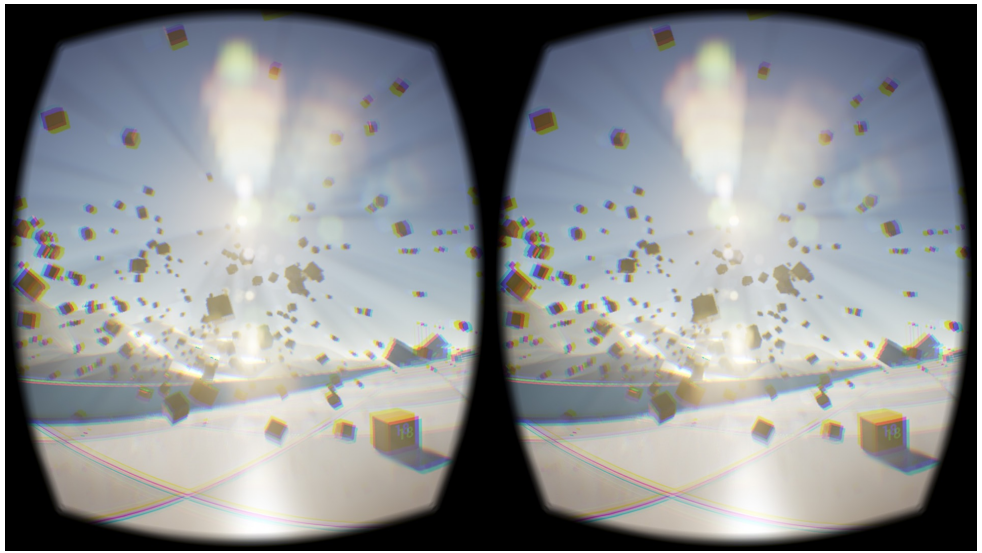
http://electricarchaeology.ca/2015/05/20/low-friction-augmented-reality

„Mixed Reality“

integrates computer-generated content into the real world so that the digital and real worlds can interact with each other (also called augmented virtuality or merged reality).

https://mk0uploadvrcom4bcwhj.kinstacdn.com/wp-content/uploads/2017/01/Featured-image-.jpg
https://sensor-magazin.de/app/uploads/2020/09/Sensor-Pokemon-Jonas-1-Impergator_original.jpg

HARDWARE: VIRTUAL REALITY HEADSET



Sight through a Virtua Reality Headset (by Ats Kurvet, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=35920265)

HARDWARE: SMART GLASSES

C. Aimone with a injection moulded eyetap by Nikon (2004)

Google Glass Enterprise 2

HARDWARE: CONTROLLER

The HTC Vive with associated controllers

Oculus Rift Touch Controller

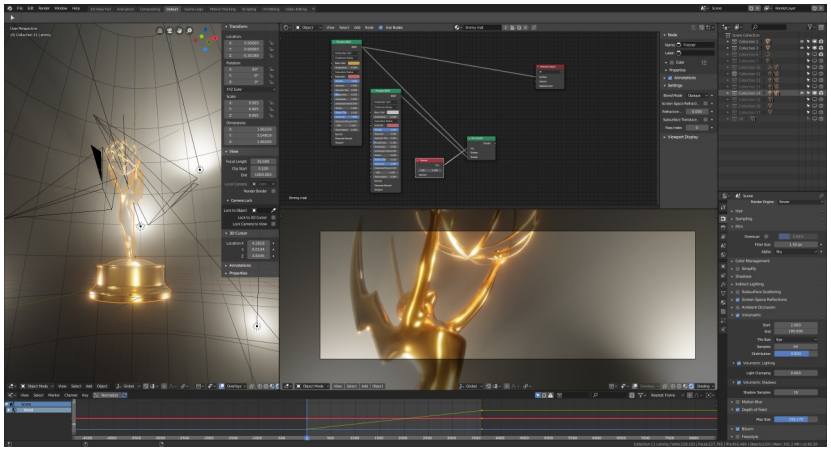
HARDWARE: CONTROLLER

Virtual Reality Simulator in Offenbach (https://www.jochen-schweizer.de/geschenkidee/vr-simulator,default,pd.html)

SOFTWARE

for calculating at least 25 images per second in real time and in stereo (separately for left and right eye)

A driving simulation requires at least 60 frames per second.



Widely used programmes for 3D modelling are:

blender, Maya, 3D Studio Max, SketchUp, Cinema 4D, LightWave 3D etc.

For interactive simulations, one uses game engines such as *unity3D* or authoring systems such as *World Tool Kit* or *World Up*.

PROGRAMMING LANGUAGE

For the presentation of multi-user, interactive, graphical 3D simulations on the Internet, the computer language **VRML/X3D** and the JavaScript-API **WebVR** are used.

https://www.web3d.org/x3d-vrml-most-widely-used-3d-formats

APPLICATION OF VR

- film and gaming
- pilot training
- vehicle development
- occupational health and safety
- spatial planning
- advertising and real estate industry
- virtual online shops
- virtual exhibitions
- simulation and reconstruction of historical places

Simulationsübung zum Fallschirmspringen

https://en.wikipedia.org/wiki/Virtual_reality_applications

STRATEGIES, METHODS AND STANDARDS OF DIGITAL IMPLEMENTATION: LONDON CHARTER

London Charter

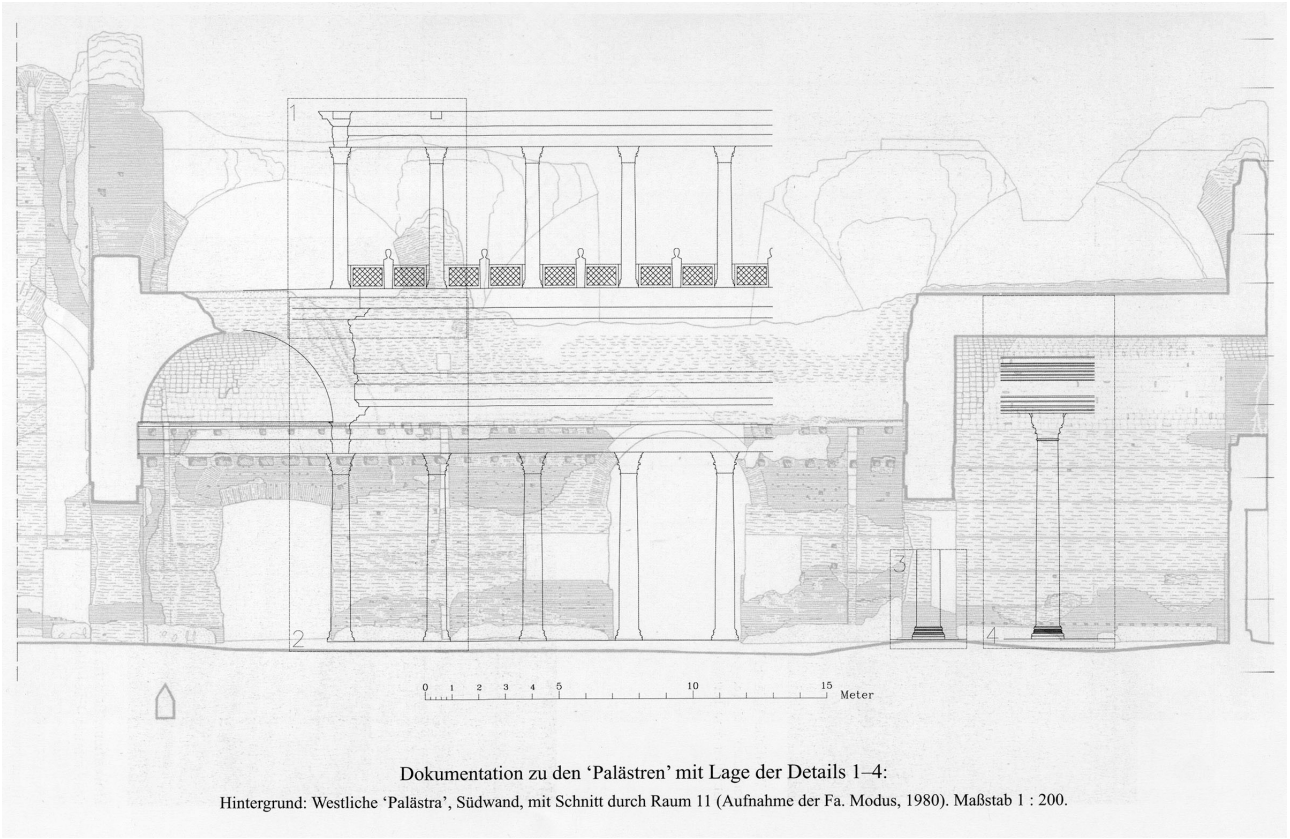
The London Charter for the computer-based visualisation of Cultural Heritage, Version 2.1 (Februar 2009): http://www.londoncharter.org/fileadmin/templates/main/docs/london_charter_2_1_en.pdf

Hugh Denard, A New Introduction to the London Charter, in: A. Bentkowska-Kafel – D. Baker – H. Denard (Hrsg.) Paradata and Transparency in Virtual Heritage. Digital Research in the Arts and Humanities Series (Farnham 2012) 57–71, http://www.londoncharter.org/introduction.html

The Seville Charter: International Charter for Virtual Archaeology, revised version, July 2010 published on the International Forum of Virtual Archaeology website, http://sevilleprinciples.com.

„Virtual heritage; is it authentic or fantastic? … Visualizations … can instil greater confidence in [our] ability to produce believable interpretations of history rather than mere pretty pictures of the past.“

Donald H. Sanders, in: A. Bentkowska-Kafel – H. Denard – B. Drew (Hrsg.), Paradata and Transparency in Virtual Heritage (Farnham: Ashgate 2012)



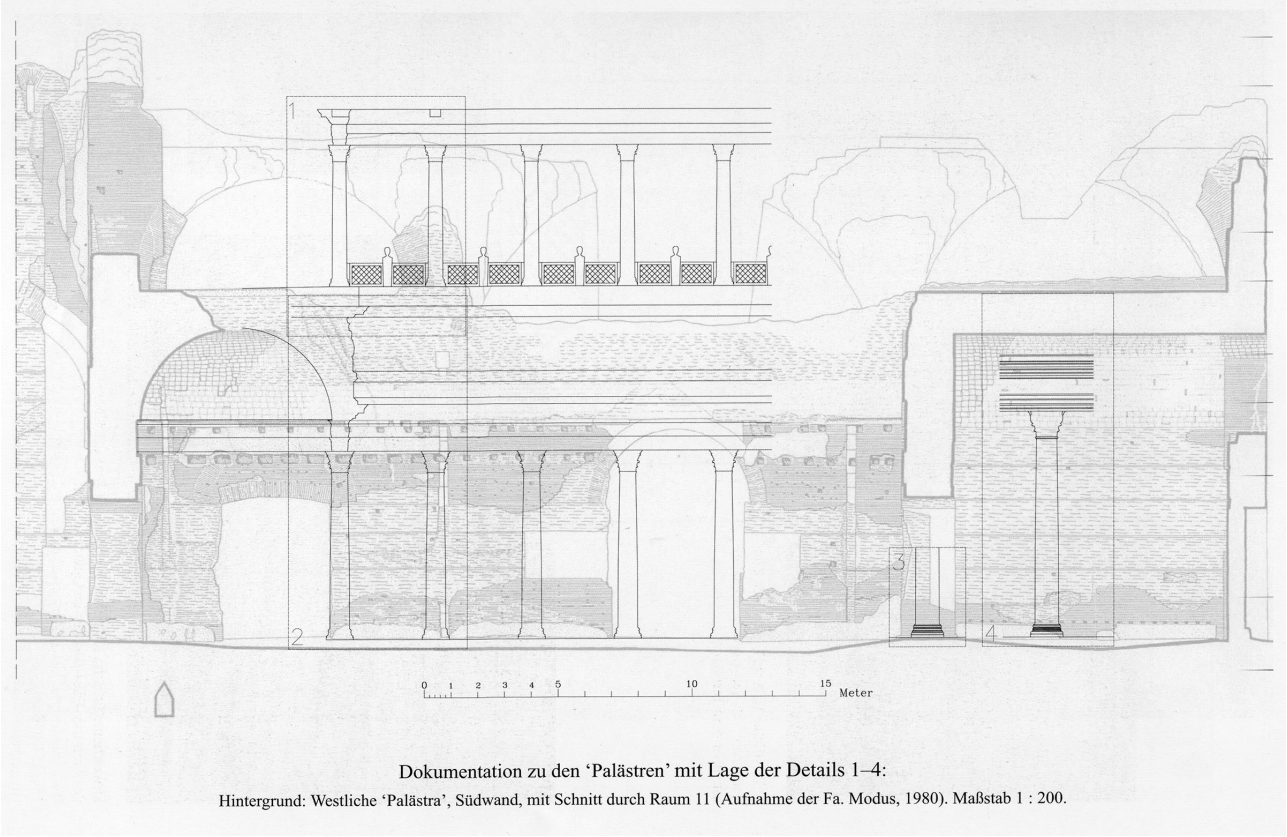
Dokumentation zu den ‘Palästren’ mit Lage der Details 1–4:
Hintergrund: Westliche ‘Palästra’, Südwand, mit Schnitt durch Raum 11 (Aufnahme der Fa. Modus, 1980). Maßstab 1 : 200.

Apply computer-based visualisation methods in a rigorous scientific manner: Separate research sources, implicit knowledge and explicit conclusions as well as visualisation-based results!

"Computational models are better understood as temporary states in a process of coming to know, rather than fixed structures of knowledge".

Anna Bentkowska-Kafel

Anna Bentkowska-Kafel, Conclusion, in: A. Bentkowska-Kafel – H. Denard – B. Drew (Hrsg.), Paradata and Transparency in Virtual Heritage (Farnham: Ashgate 2012)



Dokumentation zu den ‘Palästren’ mit Lage der Details 1–4:
Hintergrund: Westliche ‘Palästra’, Südwand, mit Schnitt durch Raum 11 (Aufnahme der Fa. Modus, 1980). Maßstab 1 : 200.

It should be made clear to users what a computer-assisted visualisation is aiming to represent, for example, the existing condition, an evidence-based restoration or a hypothetical reconstruction of a cultural object or overall facility, and of what nature and extent any factual uncertainty is.

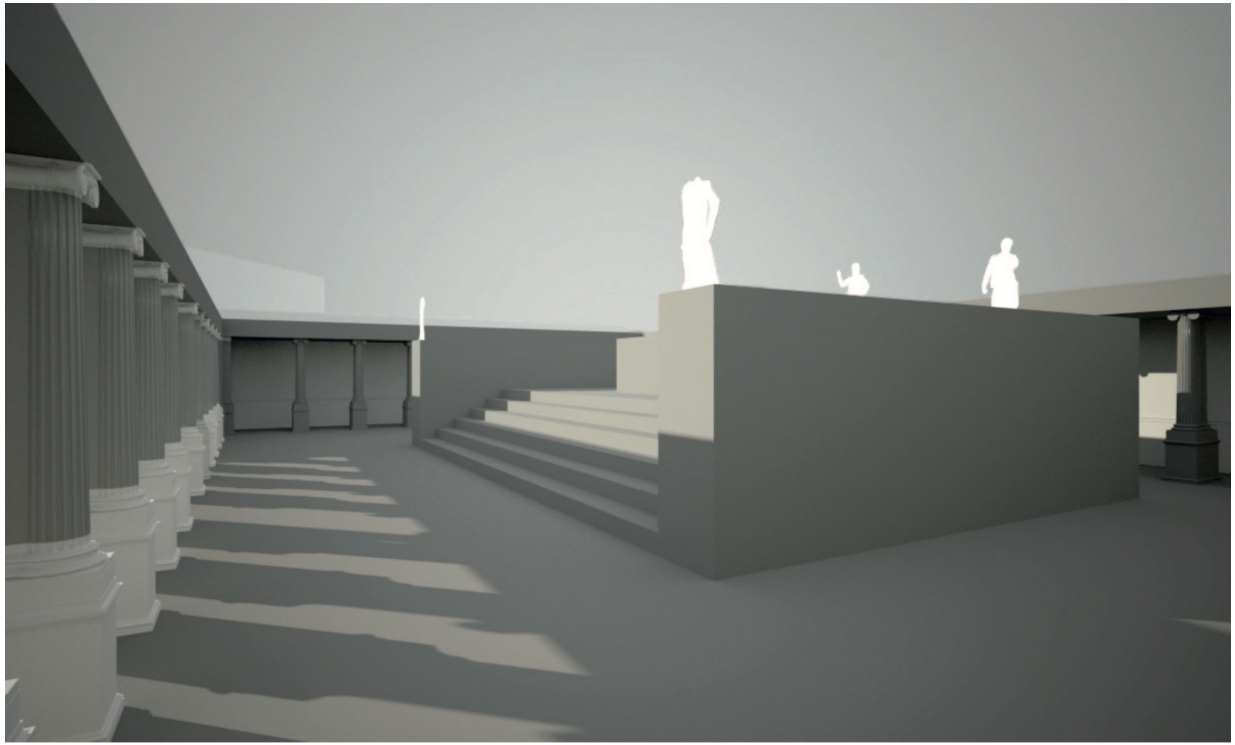
Annotated visualisations can make the basics of each reconstruction available in a pop-up window.

https://enameabbey.wordpress.com

Visualisation of a historical state in transparent 3D models over the present state (from: 3D Icons Guidelines)

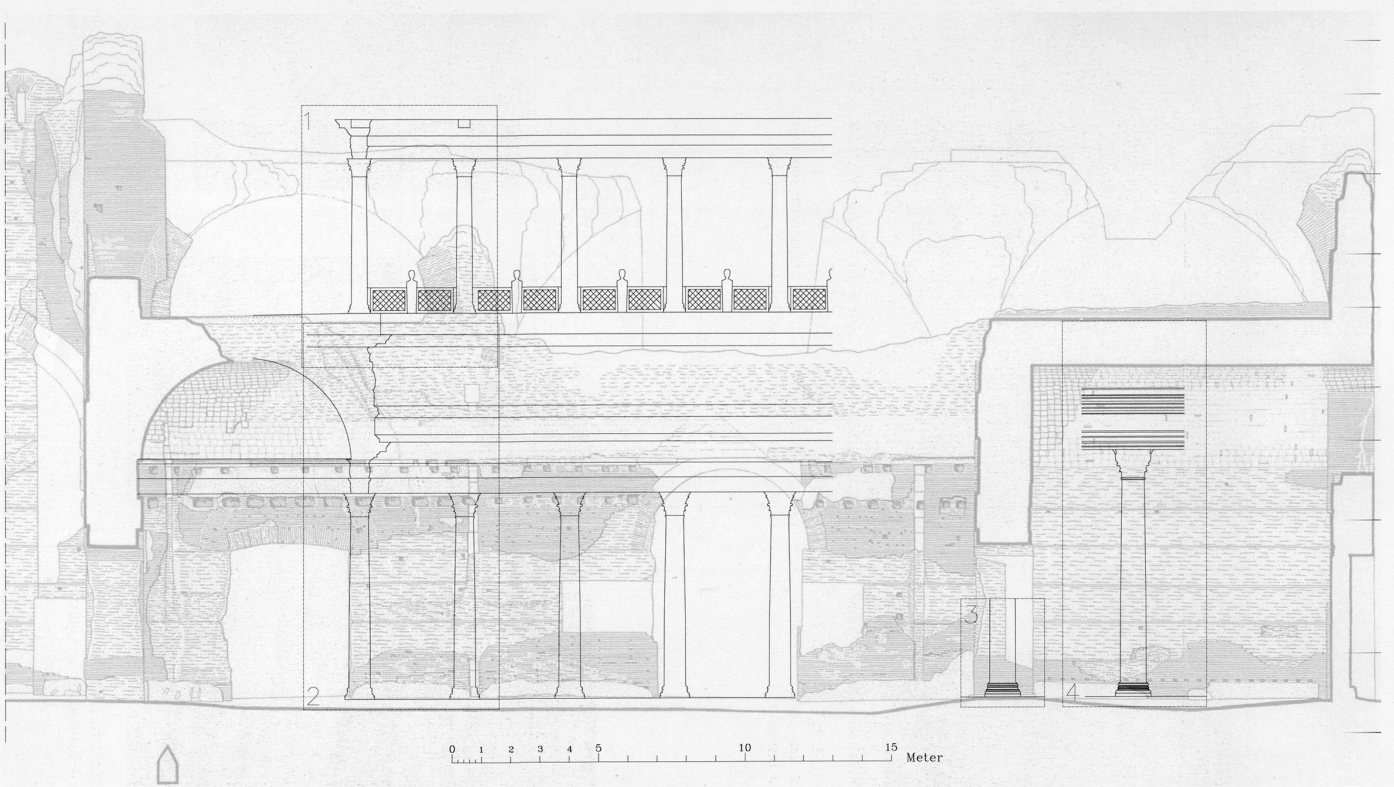
In our Este*Virtuell* project, everything that is no longer preserved is rendered in a medium shade of grey, while the objects that still exist appear in colour.

Another possibility is to visualise uncertainty through line drawings.



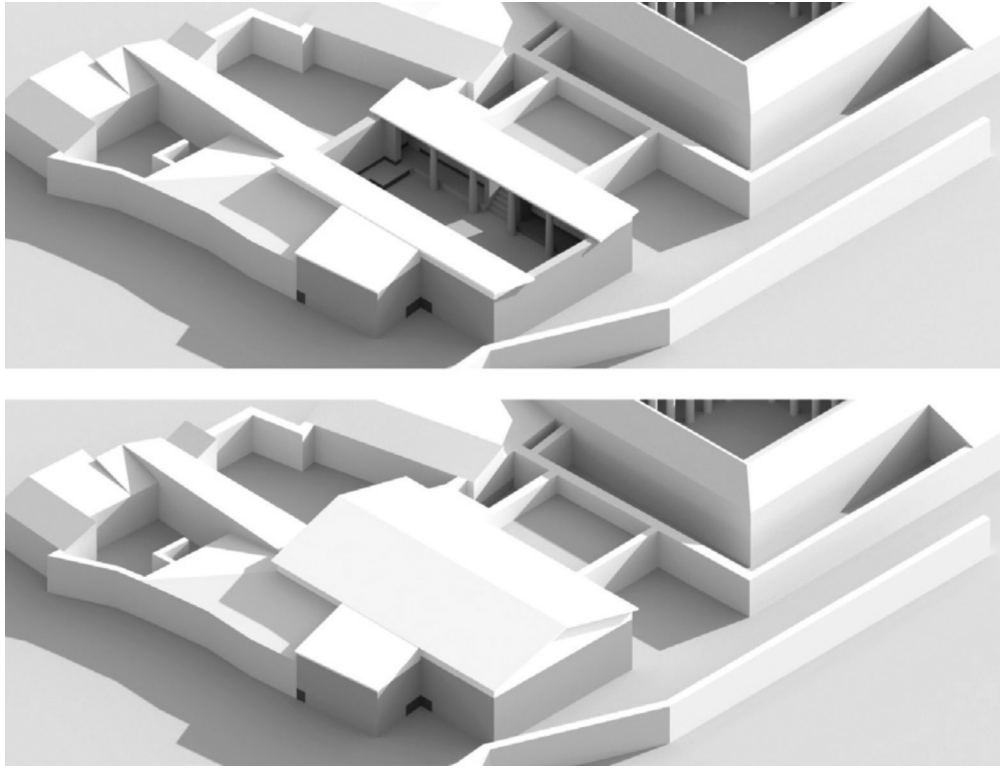
Uncertainty in detail can also be represented by geometric simplification, which is particularly evident in contrast to geometrically more detailed building elements.

Dominik Lengyel, Catherine Toulouse, Darstellung von unscharfem Wissen in der Rekonstruktion historischer Bauten. In: Katja Heine u.a. (eds), Von Handaufmaß bis High Tech III. Erfassen, modellieren, visualisieren (Mainz: von Zabern, 2011), 181–186.



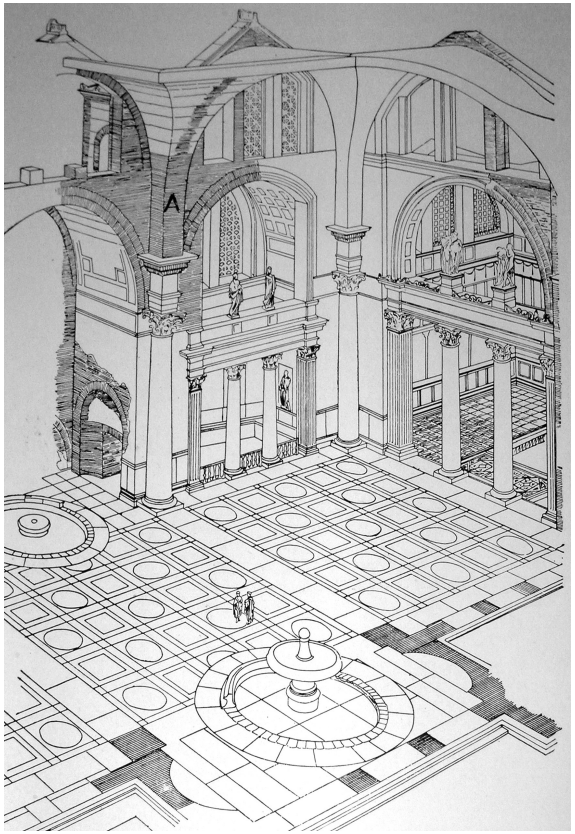
Dokumentation zu den ‘Palästren’ mit Lage der Details 1–4:
Hintergrund: Westliche ‘Palästra’, Südwand, mit Schnitt durch Raum 11 (Aufnahme der Fa. Modus, 1980). Maßstab 1 : 200.

Research results must be accurately communicated to the user: the state of the art, the differences between evidence and hypothesis, and between different levels of probability must be appropriately identified.

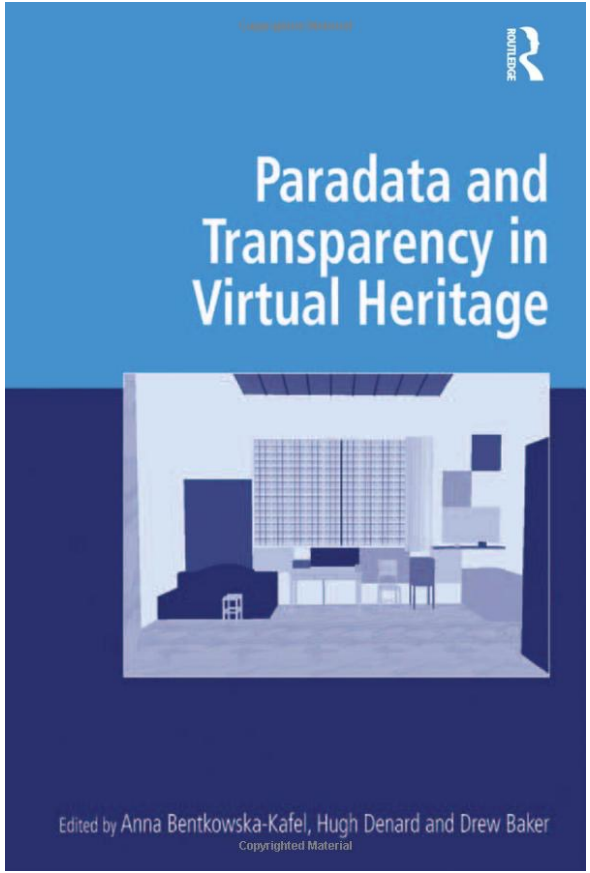


In the case of competing hypotheses one could create two models and juxtapose them in direct comparison or superimpose them alternately.

Dominik Lengyel, Catherine Toulouse, Darstellung von unscharfem Wissen in der Rekonstruktion historischer Bauten. In: Katja Heine u.a. (eds), Von Handaufmaß bis High Tech III. Erfassen, modellieren, visualisieren (Mainz: von Zabern, 2011), 181–186.



"Particular attention should be given to the way in which visual sources may be affected by ideological, historical, social, religious and aesthetic and other such factors."



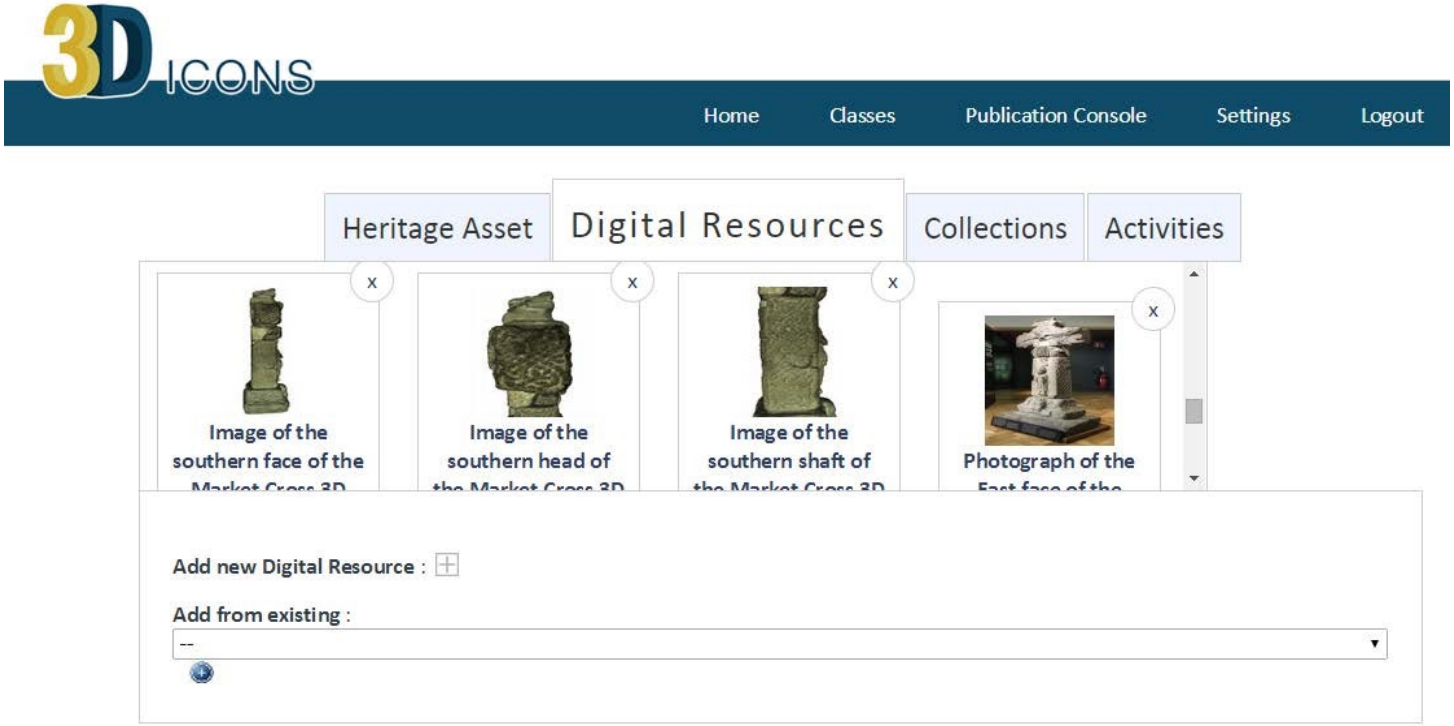
"Paradata differs from metadata in that it does not describe the object or artefact that you see, but the human processes by which it came into being."

Anna Bentkowska-Kafel, Introduction, in: A. Bentkowska-Kafel – H. Denard – B. Drew (Hrsg.), Paradata and Transparency in Virtual Heritage (Farnham: Ashgate 2012)

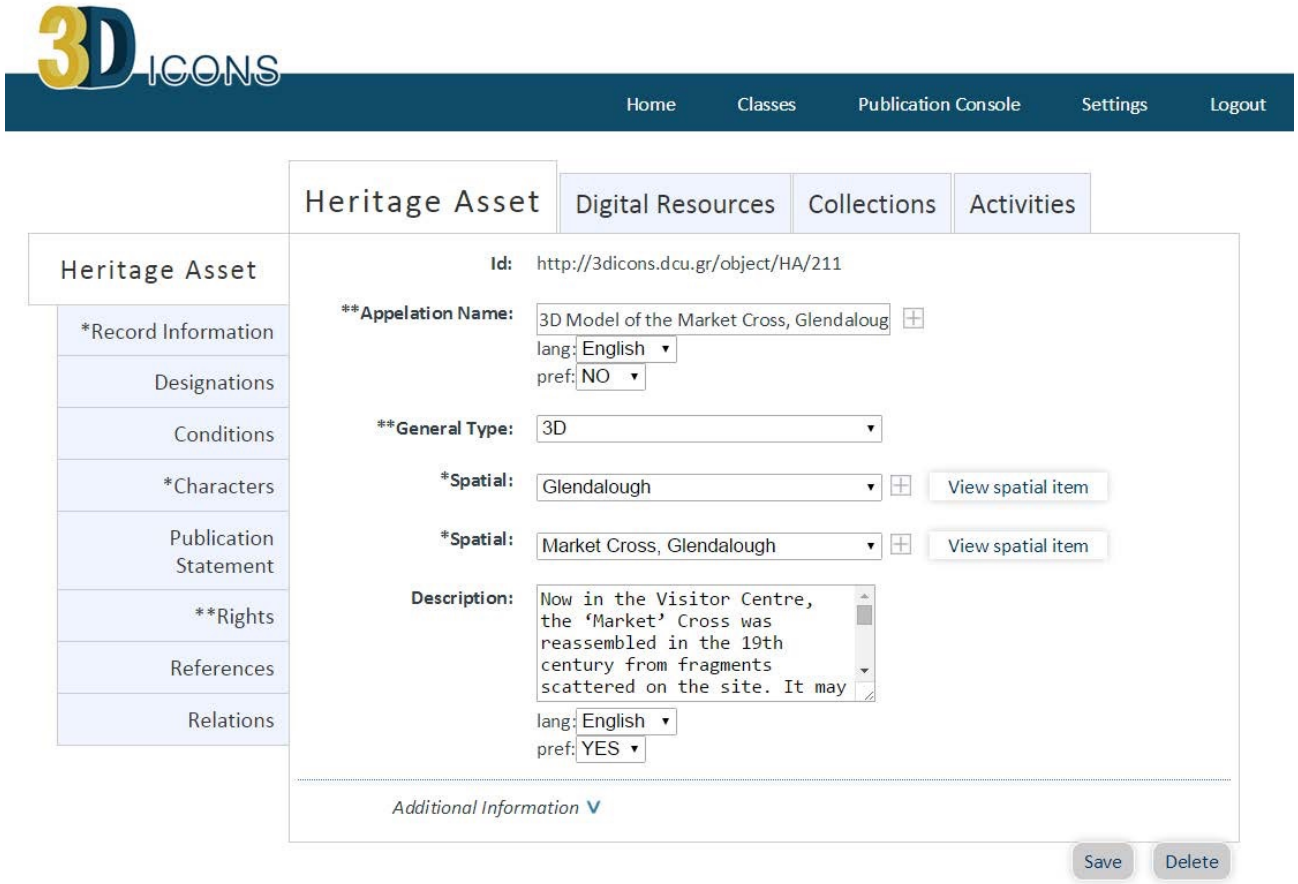
1. Systematic, documented assessment of the suitability of any method

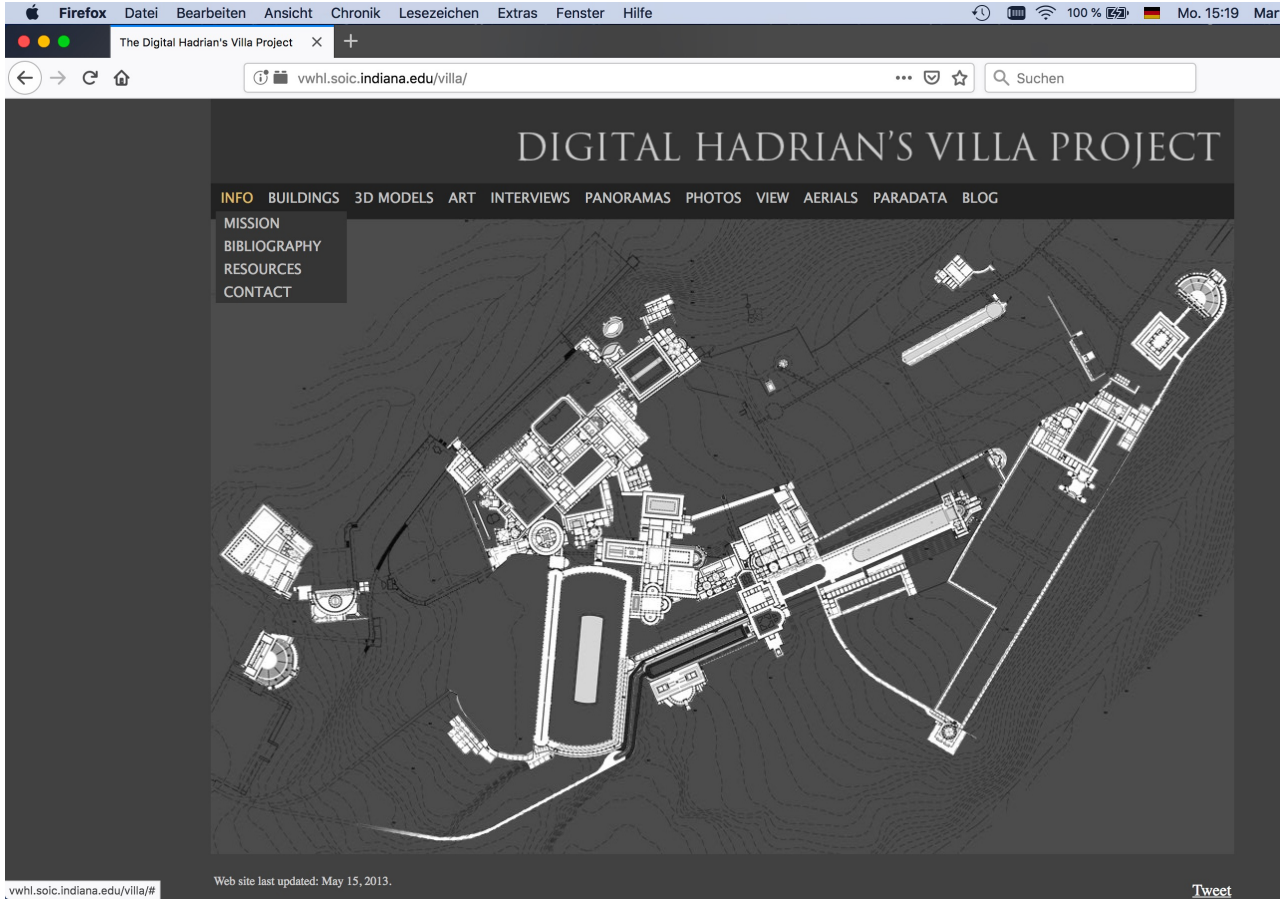
2. Evaluation of the type of visualisation. Is it more or less photorealistic, impressionistic or schematic? Are hypotheses (or even existing evidence) presented as such? Is the visualisation dynamic or static? etc.

3. Which research sources must be used and thus also documented?

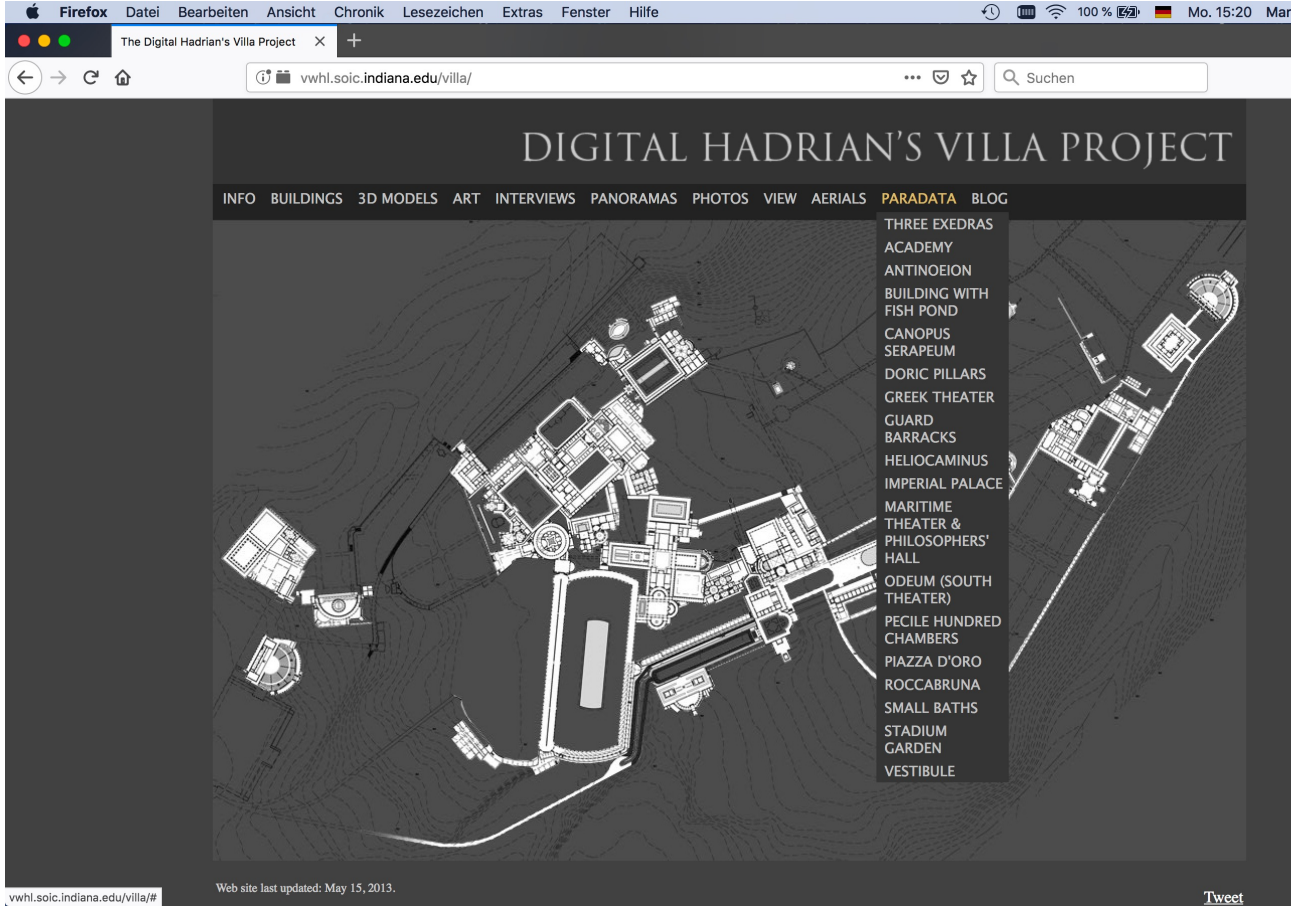


http://3dicons-project.eu

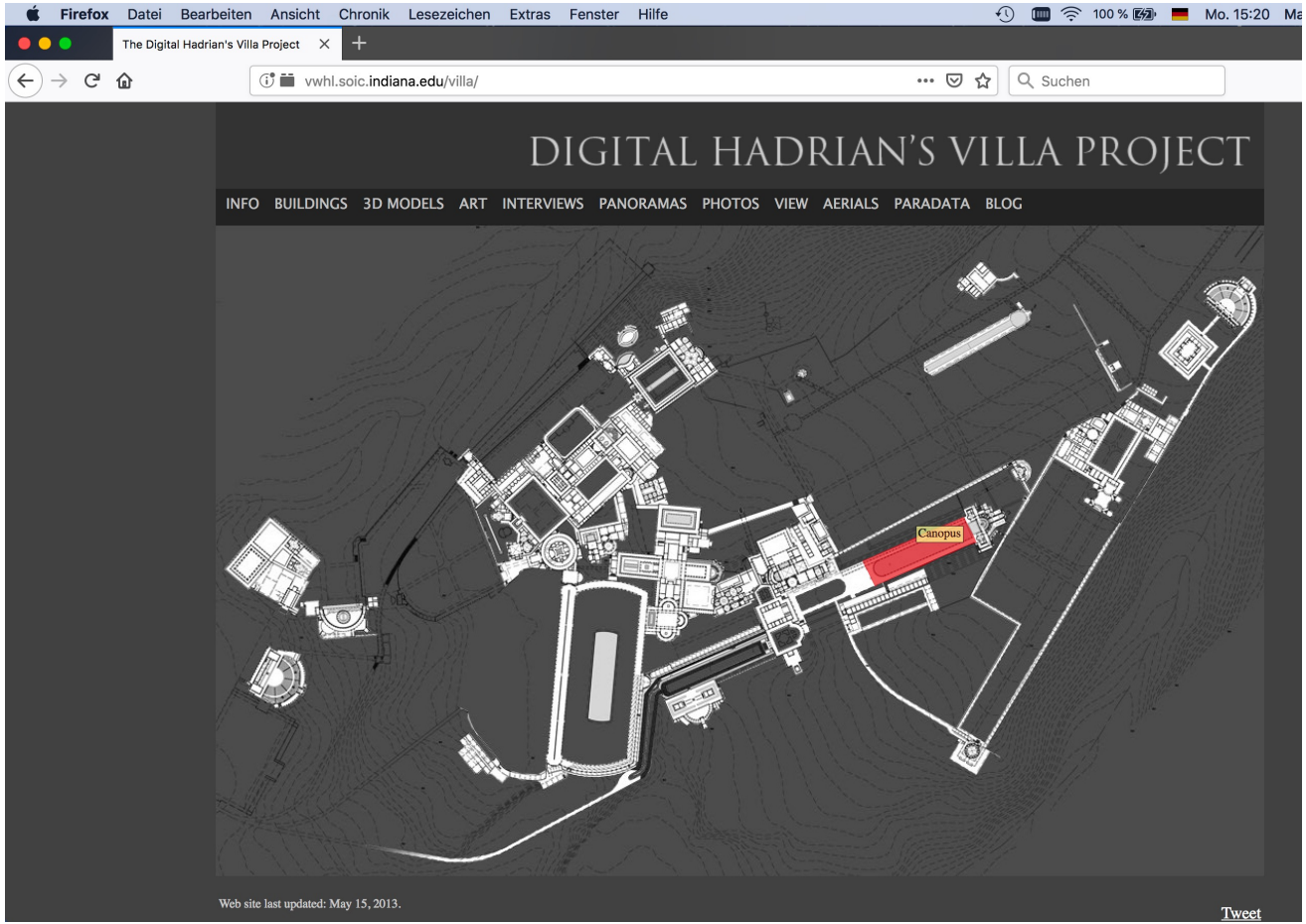

3D ICONS
Home
Classes
Publication Console
Settings
Logout
Heritage Asset
Digital Resources
Collections
Activities
Heritage Asset
*Record Information
Designations
Conditions
*Characters
Publication Statement
**Rights
References
Relations
Id:
http://3dicons.dcu.gr/object/HA/211
**Appelation Name:
3D Model of the Market Cross, Glendaloug
lang: English
pref: NO
**General Type:
3D
*Spatial:
Glendalough
View spatial item
*Spatial:
Market Cross, Glendalough
View spatial item
Description:
Now in the Visitor Centre, the 'Market' Cross was reassembled in the 19th century from fragments scattered on the site. It may
lang: English
pref: YES
Additional Information
Save
Delete



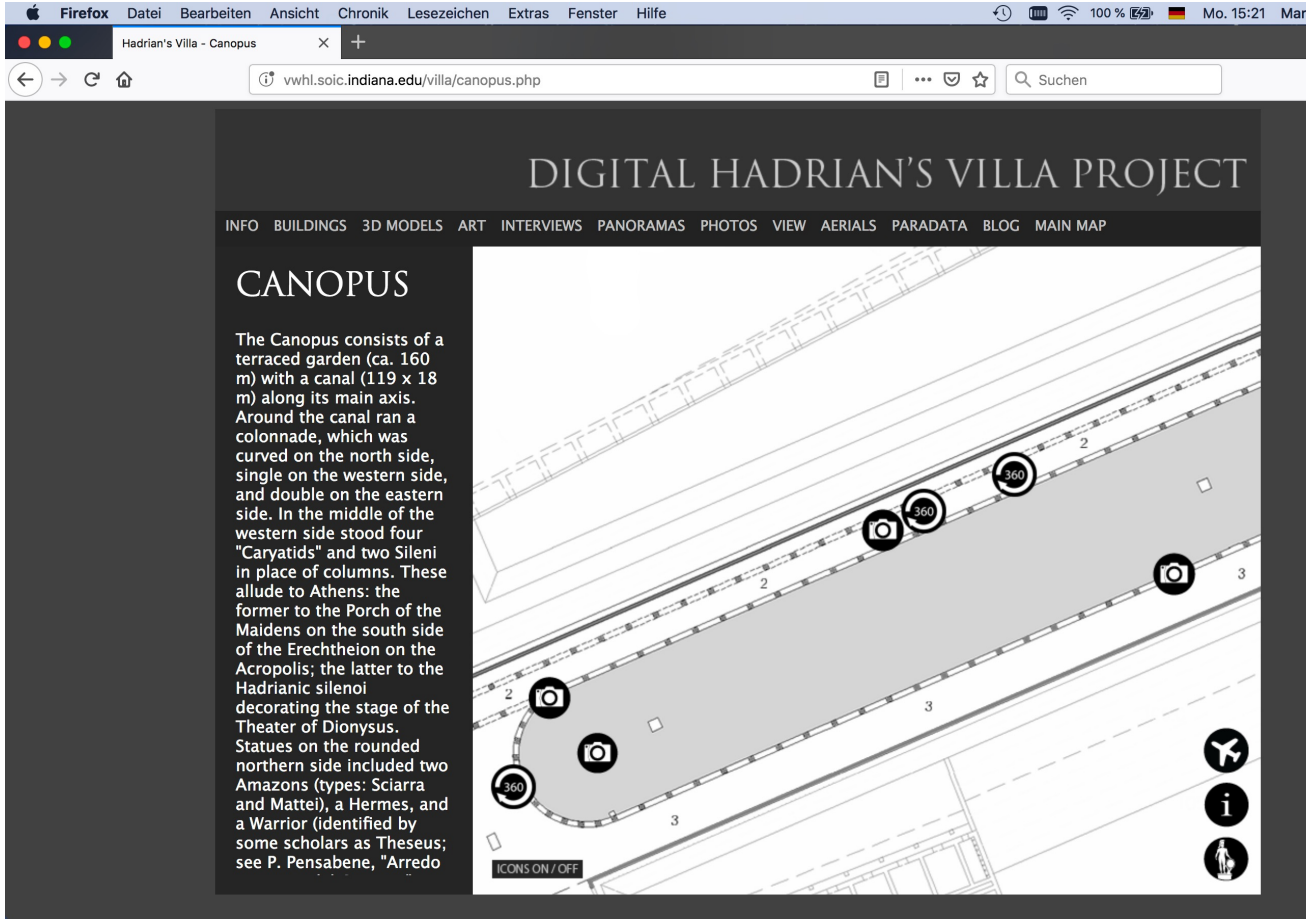
http://vwhl.soic.indiana.edu/villa/



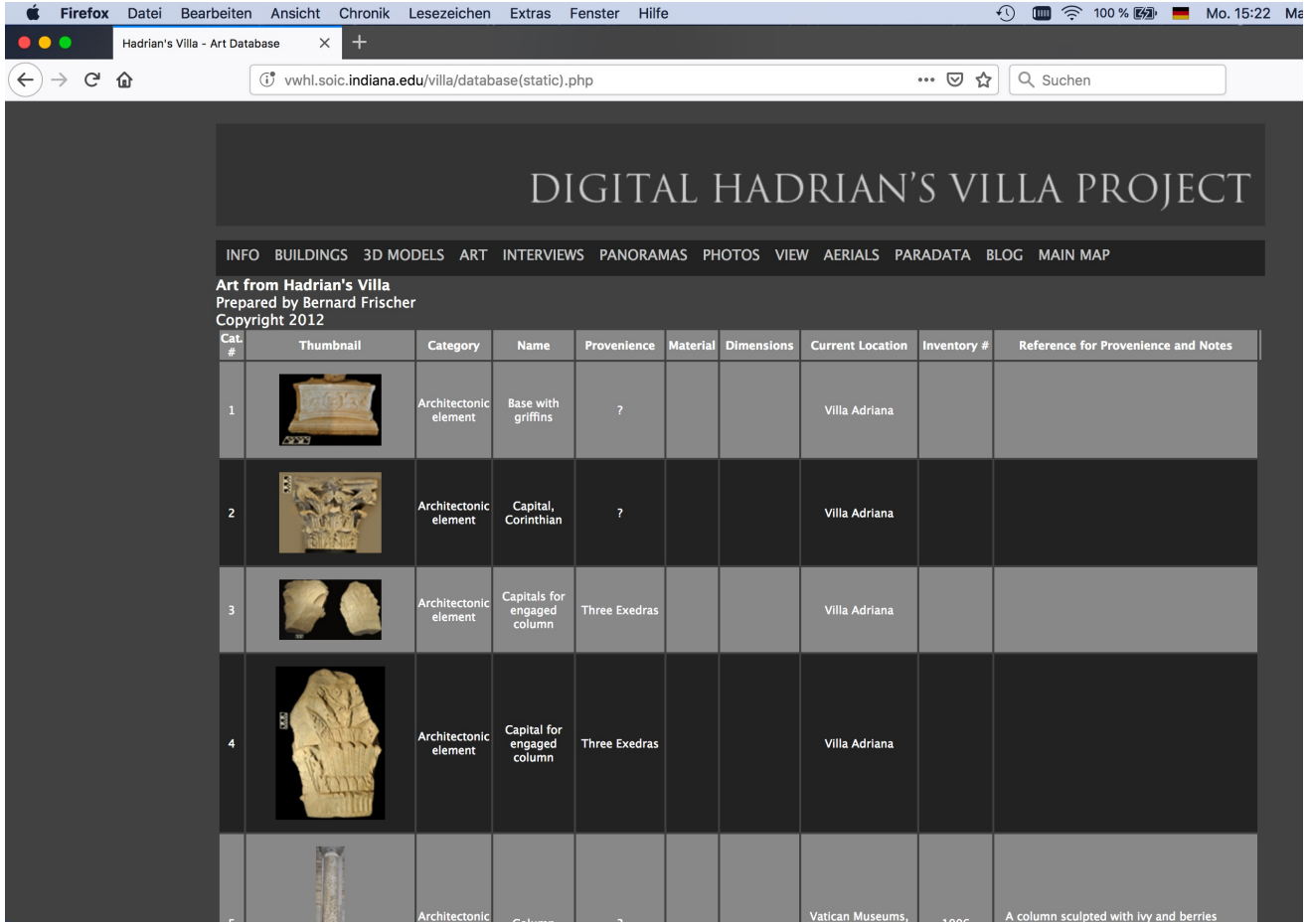
http://vwhl.soic.indiana.edu/villa/



http://vwhl.soic.indiana.edu/villa/

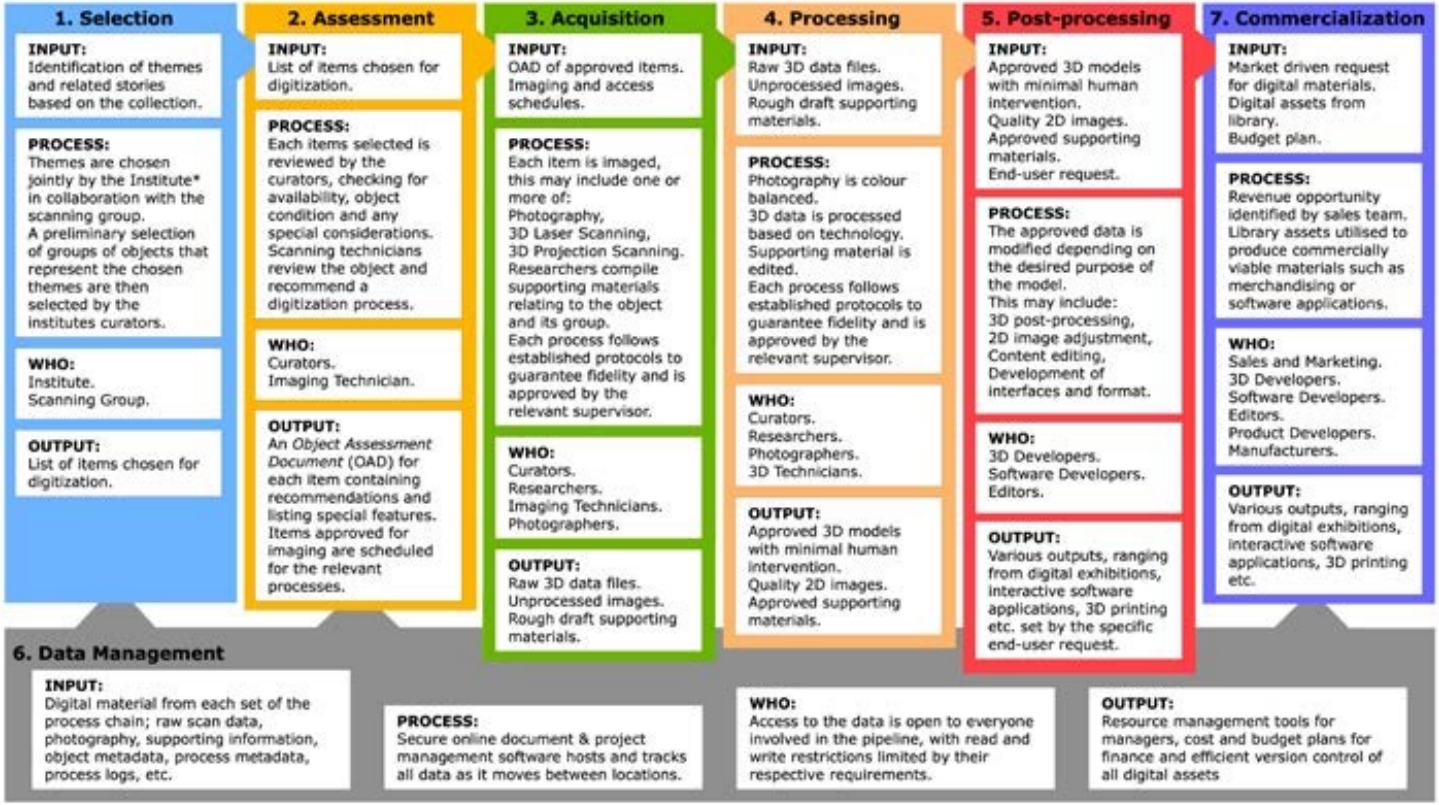


http://vwhl.soic.indiana.edu/villa/



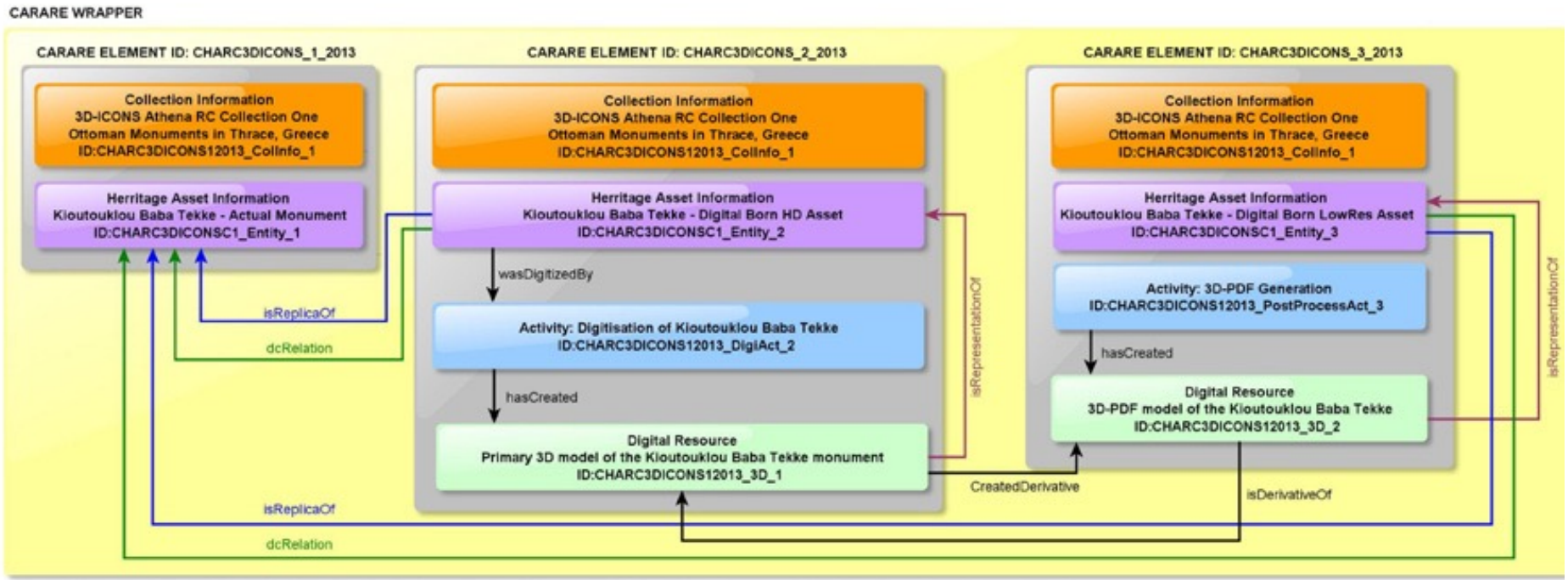
http://vwhl.soic.indiana.edu/villa/

=> Develop implementation strategy for the London Charter:



3D-ICONS Guidelines Page 44

*Institute refers to the organization responsible for managing a particular collection.



Note: The beginning of each line indicates the schema's elements where the relationship is being defined. The arrow points at the element's ID being mentioned

http://www.carare.eu

Category	Variable	Characteristics, examples
Sources	type of source	original, acquired data, images, texts, "logical source"
	inherent knowledge	primary source, secondary source
Model quality	geometrical fidelity	accuracy, detail, coherence
	radiometric fidelity	properties, properties depending on accuracy, detail, coherence
	temporal fidelity	properties, properties depending on accuracy, detail, coherence
Documentation	result documentation	reference ontology, application ontology
	process documentation	approach
Technology	technological domain	GIS, VR, CAD, BIM
	model genetic workflow	semi-automated genesis, procedural generators, human-driven modeling approach
	tools	software
	geometry data type	point cloud, wireframe model, polygon model, voxel model, parametric model (program)
Project cooperation	project scale	employees, budget
	project dates	start and end date
	involved competencies	humanities, design, technologies
Historical object	type of object	static artifact, dynamic artifact
	general object properties	tangibility, temporality
	date of origin	year, period
	location	place

- Selection
- Assessment
- Acquisition
- Processing
- Post-processing
- Data Management

S Münster – W Hegel – C Kröber, A classification model for digital 3D reconstruction in the context of humanities research, in: S. Münster, M. Pfarr-Harfst, P. Kuroczynski, M. Ioannides (Hrsg.), 3D Research Challenges in Cultural Heritage II (Berlin 2016): https://www.researchgate.net/publication/309385677_A_classification_model_for_digital_reconstruction_in_context_of_humanities_research

DOCUMENTATION METHODS

Category	Ethno-Nature Park "Uch Enmek"	GEPAM Memorial Landscapes
Sources		
Type of sources	- acquired data (satellite images, digital elevation models (DEM)) - excavation plans - contemporary photographs - physical remains	- texts - pictures - photographs - plans - remaining buildings
Inherent knowledge	- primary source with probability of changes: courgan remains - secondary sources: excavation plans, satellite images	- primary sources: 34 remaining buildings with modifications, 58 lost buildings - secondary historical sources: artistic pictures, photographs, plans - secondary contemporary sources: photographs, plans, texts
Model quality		
Geometrical fidelity	- level of detail (LOD) 2 models and generalized land use	- LOD1 of city landscape - LOD3 of buildings relevant for the subject
Radiometric fidelity	- generalized color scheme	- generalized color scheme
Temporal fidelity	- no temporal changes	- transitions: per year, binary (display/no display)
Documentation		
Process documentation	- textual within thesis	- periodical protocols and changelogs
Results documentation	- not indexed by metadata	- XML-metadata: time, author, location - for LOD 1 objects according to GIS
Technology		
Technological domain	- GIS-based modeling of landscape - VR modeling of obstacles, based on acquired data	- GIS-based modeling for LOD1 objects - VR-modeling for LOD 3 objects
Model genetic workflow	- semi-automated modeling of landscape	- human-driven modeling of obstacles

4. Documentation strategies should actively improve visualisation activities. Document all sources (models, images and literature) you have used! Make clear all uncertainties and the degree of accuracy!

Abbildung 2: Apodyterium der Männer der Stabianer Thermen in Pompeji, Flickr.

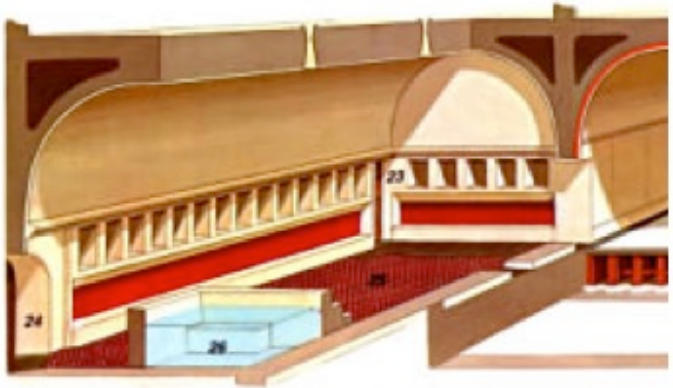


Abbildung 4: Rekonstruktion des Apodyteriums der Männer der Stabianer Thermen in Pompeji, Pompéi - Eléments de Civilisation.

a) Enable rigorous, comparative analysis and evaluation of computer-generated visualisations.

b) What condition is being represented?

c) Complete list of research sources used.

d) Documentation of processes (paradata): documentation of evaluative, analytical, deductive, interpretative and creative decisions

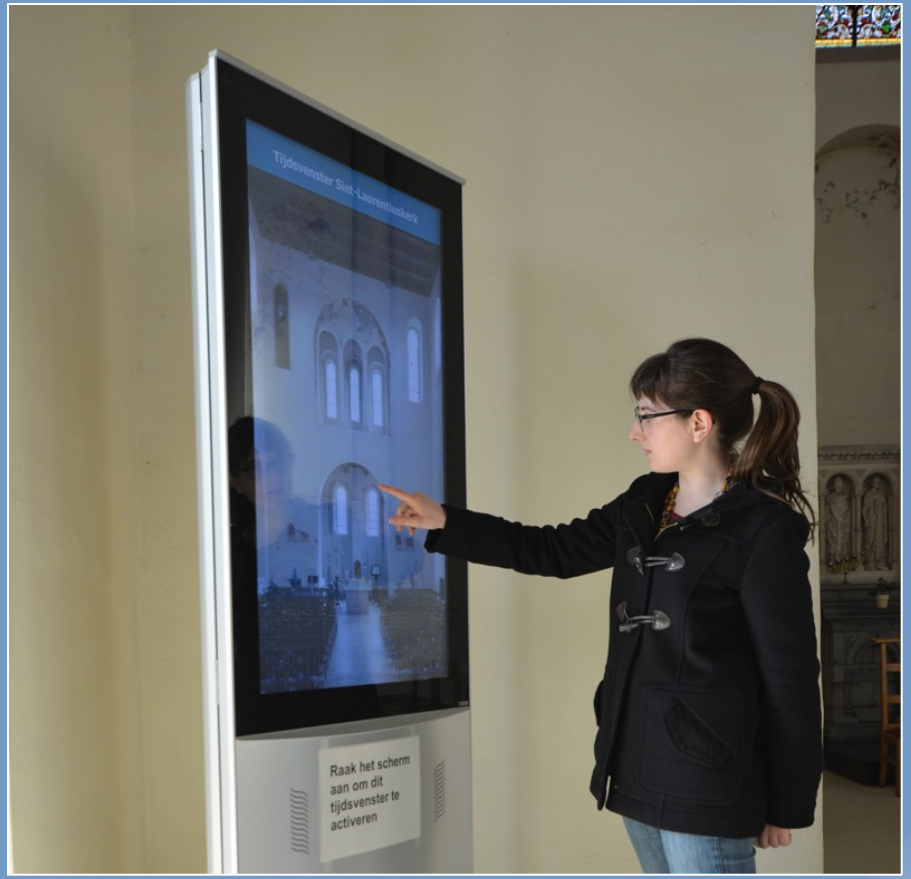
e) Documentation and justification of the chosen visualisation method

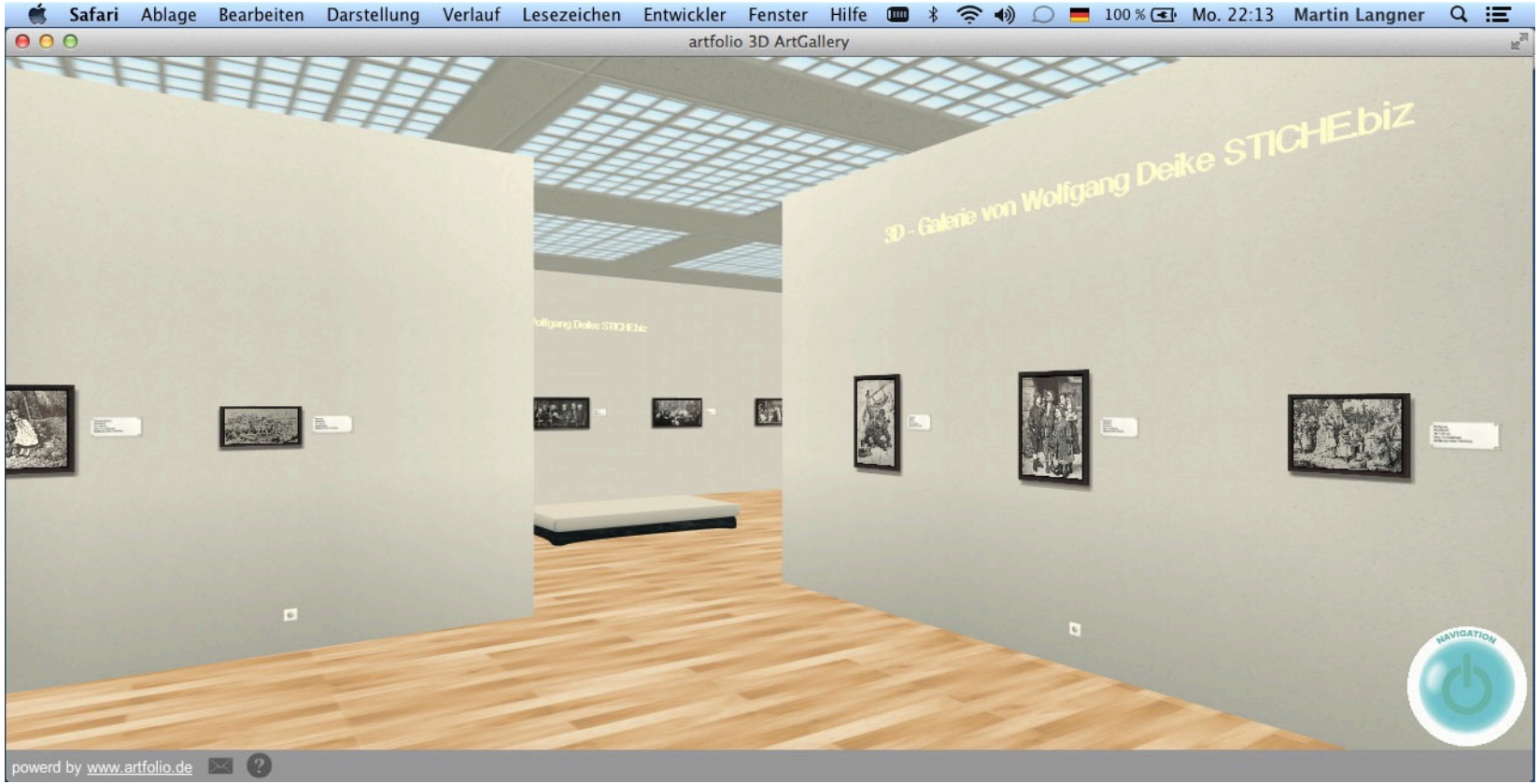
f) Documentation of the linking of dependencies

g) Documentation of formats and standards

THINK ABOUT WHERE AND HOW YOU WANT TO DOCUMENT WHAT!

EXAMPLES OF DIGITAL MODELLING OF SPACE AND TIME

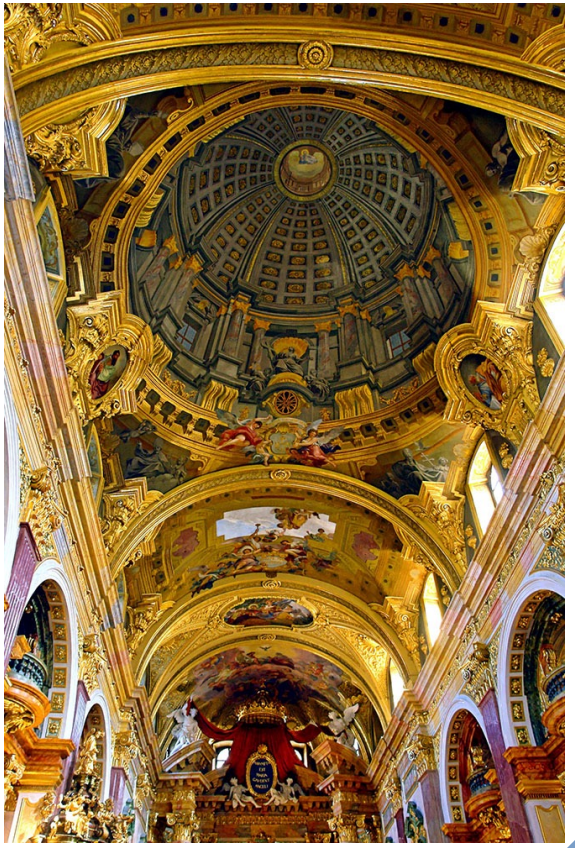




www.artfolio.de

David Teniers the Younger, The Archduke Leopold Wilhelm in his Gallery in Brussels (1653)

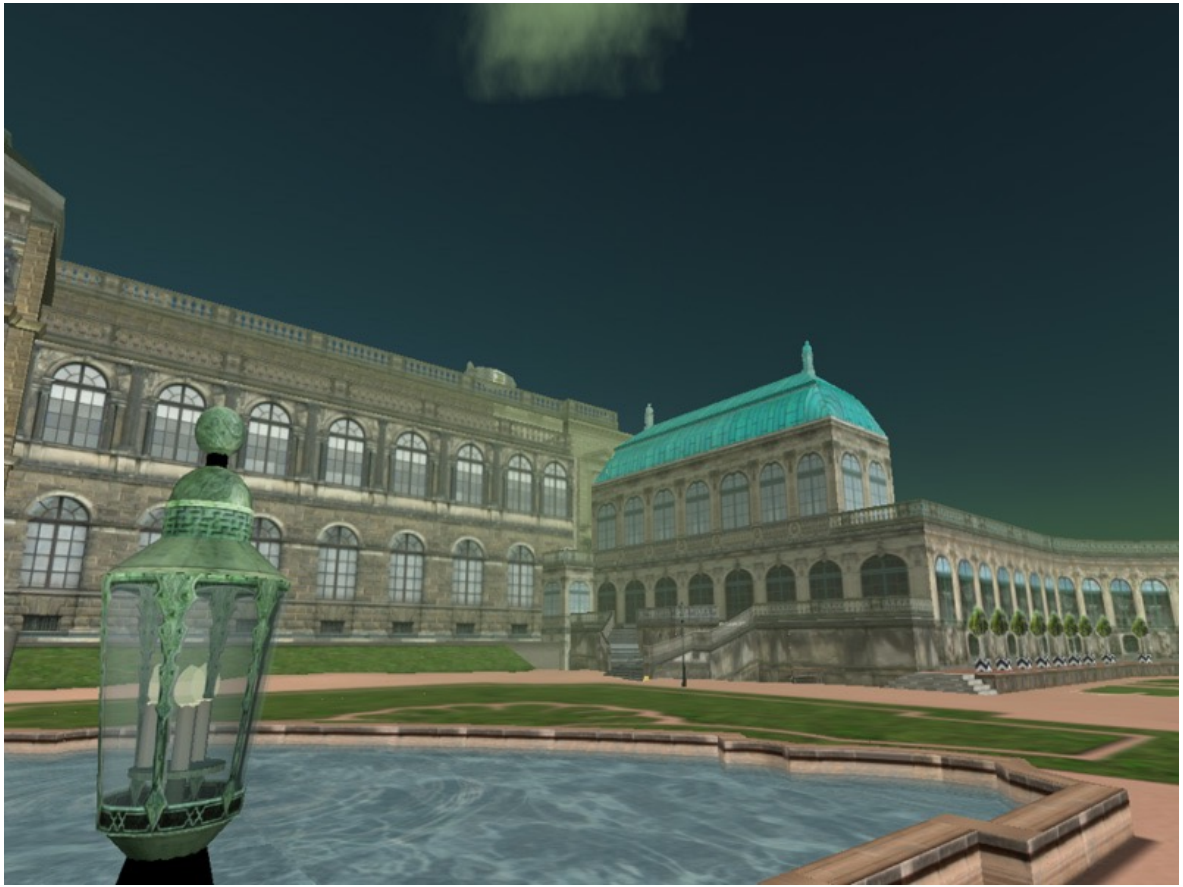
Louis Preusser, In der Dresdner Galerie (1881)



Andrea Pozzo, Jesuitenkirche in Wien (1703)

“Dresden Gallery” in Second Life (2008)

By the end of 2009, the 'Dresden Gallery' in Second Life was visited by 60,000 users a year, which is about 10% of the annual visitors to the Gemäldegalerie (500,000 visitors a year). The visitors in Second Life spent an average of 40 minutes in the "Dresden Gallery" (the average stay in the real gallery at the time was 45 minutes).



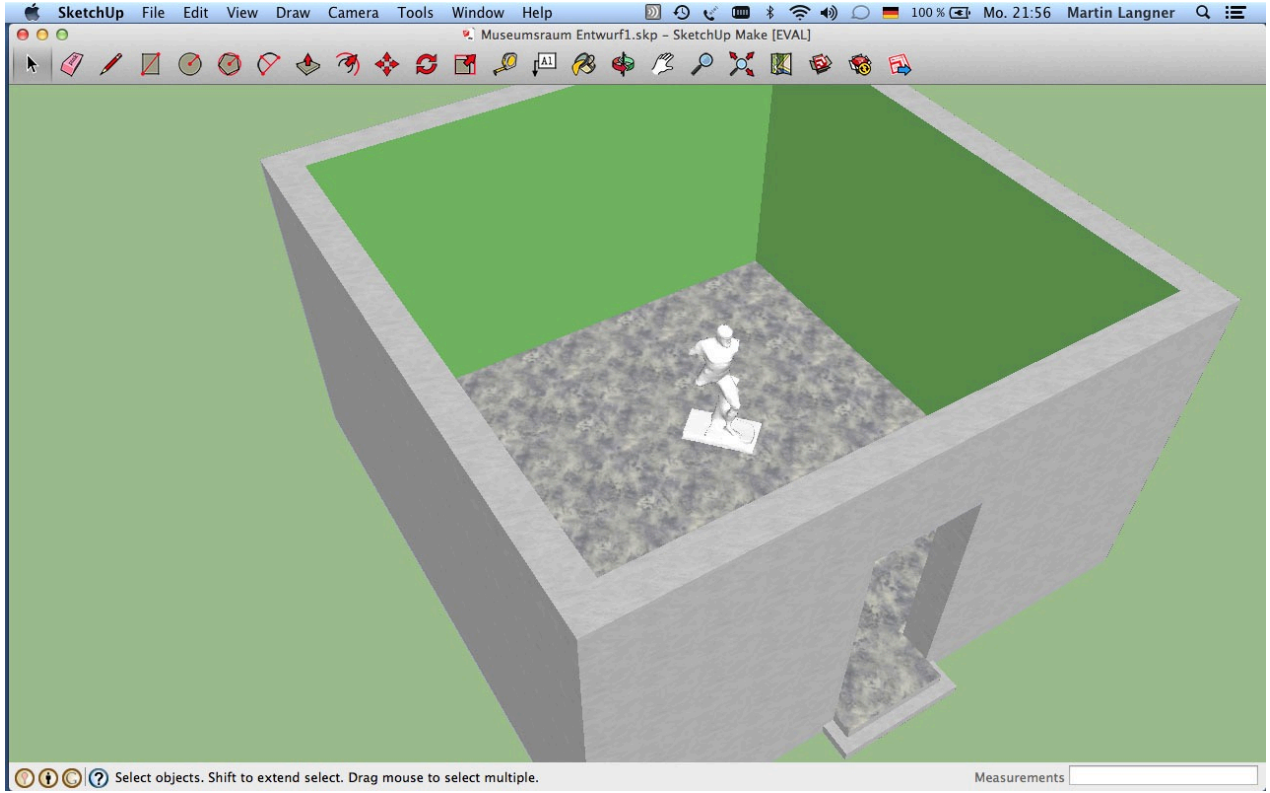
The Dresden Zwinger with the Gemäldegalerie in Second Life (2008)

http://treet.tv/shows/designingworlds/episodes/ep032

„Presenting MUSEUM, a fully modeled natural history museum. This 3D world is an interactive level for Counter-Strike, the most popular online computer game today.“

http://www.prehistoricplanet.com/3d/de_museum.htm

http://games.brothersoft.com/escape-the-museum-for-mac.html



http://de.wikipedia.org/wiki/SketchUp_ (Software)
http://www.youtube.com/watch?v=1SIOcvFZnEA

ENAME

Village on the Scheldt near Oundenaarde

Excavation, museum and time scope awarded with many prizes

http://www.pam-ov.be/ename/erfgoed/
http://heritage.visualdimension.be/

The virtual 4D reconstruction was implemented by Visual Dimension bvba (Daniel Pletinckx u.a.) in the Projects **Ename974** (1997–2006), **EPOCH** (2004–2008, http://epoch-net.org/site/), **3D-coform** (2008–2012, http://3dicons-project.eu), **CARARE** (2010–2013, http://www.carare.eu), **V-MusT** (2011–2014, http://v-must.net) sowie **3D-ICONS** (2012–2015, http://3dicons-project.eu)

ENAME, SAINT SALVATOR ABBEY, AD 1065

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME, SAINT SALVATOR ABBEY, AD 1085

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME, SAINT SALVATOR ABBEY, AD 1150

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ENAME, SAINT SALVATOR ABBEY, AD 1500

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME, SAINT SALVATOR ABBEY, AD 1595

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

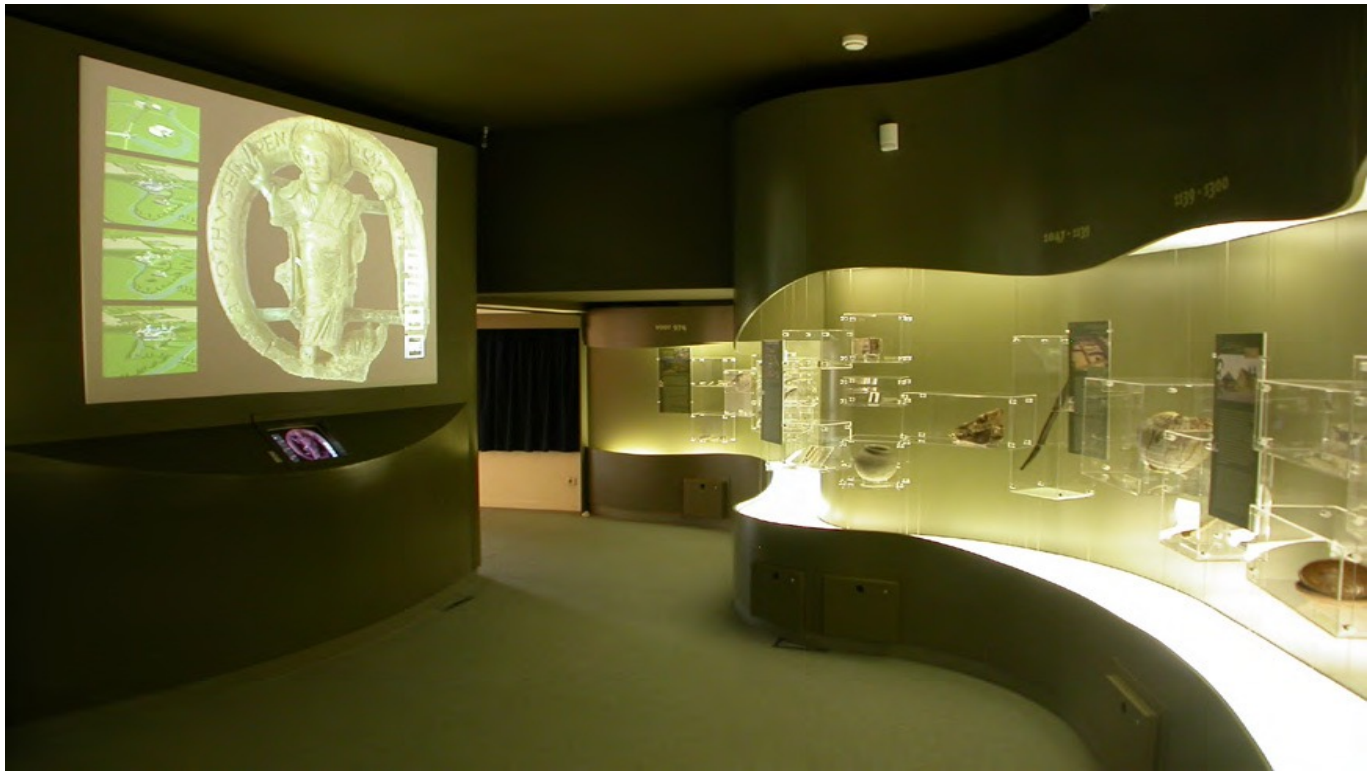
ENAME, SAINT SALVATOR ABBEY, AD 1665

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME, SAINT SALVATOR ABBEY, AD 1730

https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME TIME LINE



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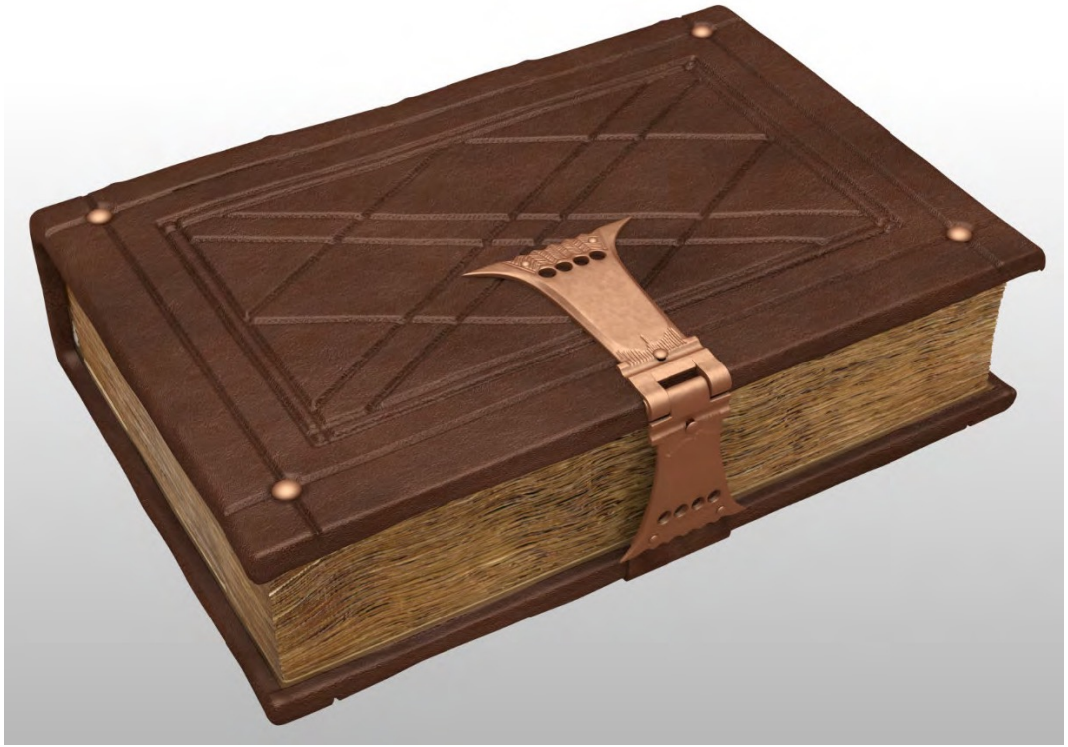
ENAME TIME LINE



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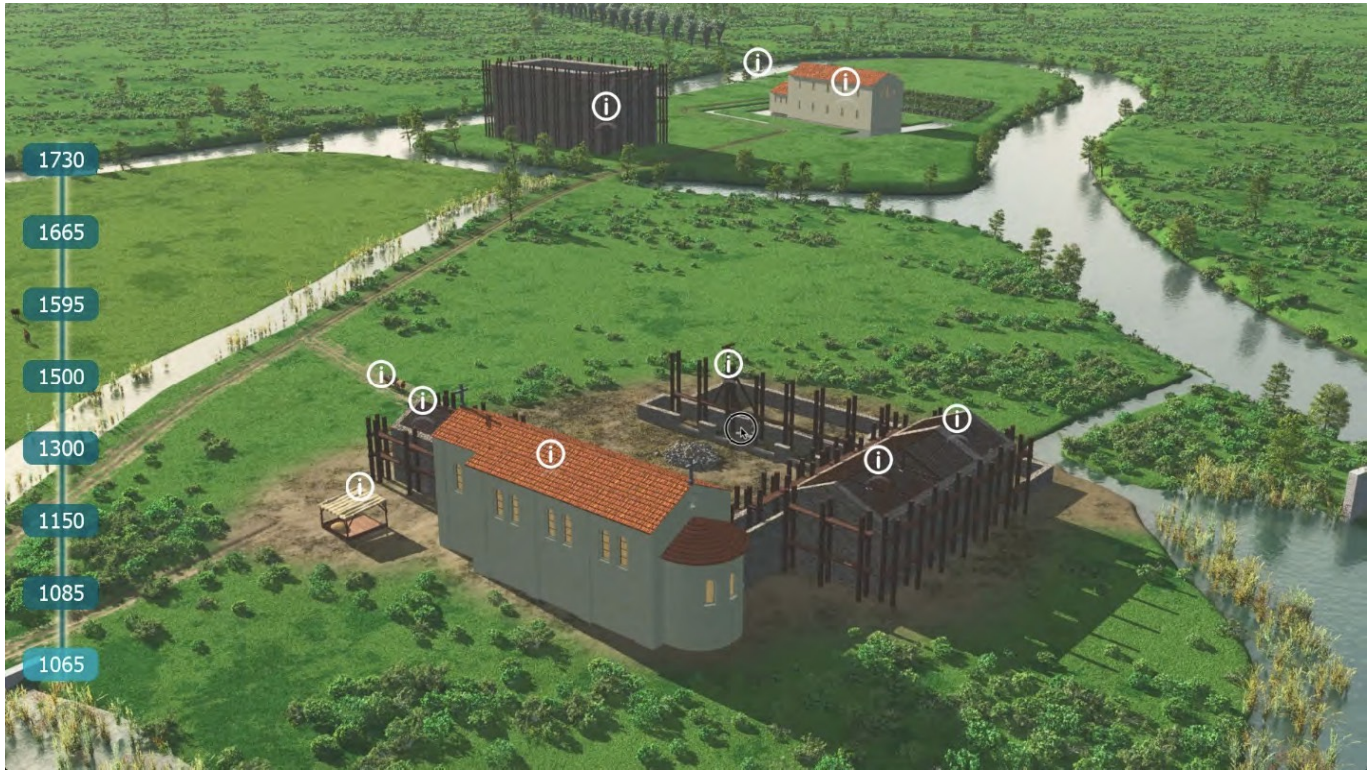
ENAME TIME LINE



http://vimeo.com/82734282

https://enameabbey.wordpress.com

ENAME TIME SCOPE

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ENAME TIME SCOPE

ENAME TIME SCOPE

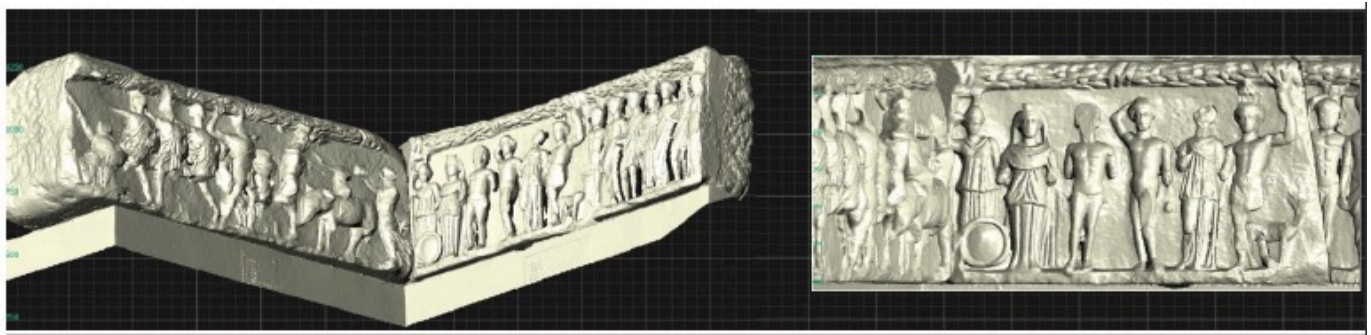
https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

ENAME, PROJECT 2018

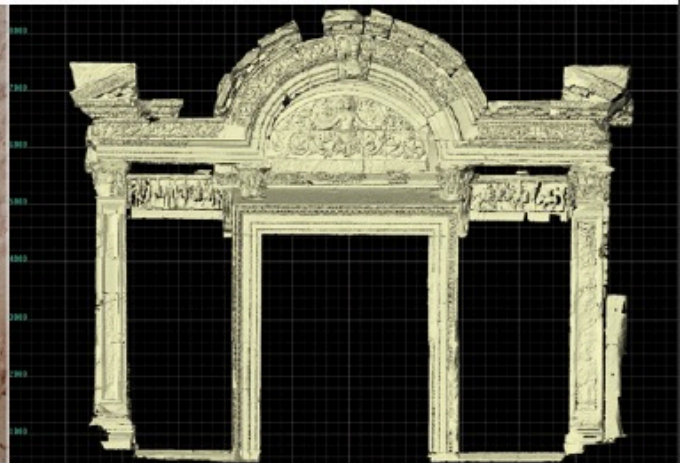
https://de.slideshare.net/slideshow/embed_code/key/m2beS3RRNZKMmK

The Nymphaeum of Sagalassos / Southern Turkey

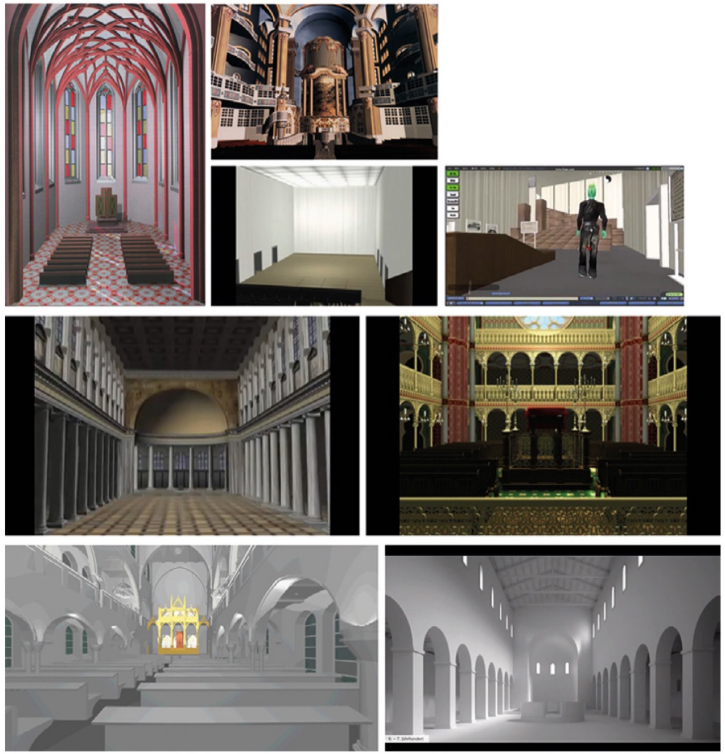
The Nymphaeum of Sagalassos / Southern Turkey



3D-Visualisierung der zwei Originalfriesblöcke, gescannt im Efes Museum Selçuk

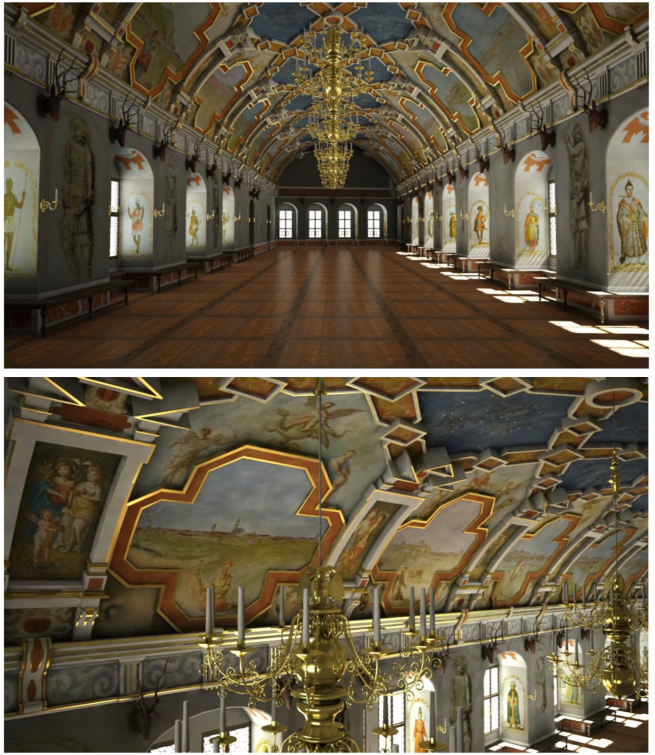


Rome, Villa Giulia
Monte Michele Tomb 5



Heike Messemer, Digitale 3D-Modelle historischer Architektur. Entwicklung, Potentiale und Analyse eines neuen Bildmediums aus kunsthistorischer Perspektive (Heidelberg: arthistoricum.net, 2020): https://books.ub.uni-heidelberg.de/arthistoricum/catalog/book/516

Stephan Hoppe, Hubert Locher und Matteo Burioni (Hrsg.), Digitale Raumdarstellung. Barocke Deckenmalerei und Virtual Reality (Heidelberg: arthistoricum.net, 2020): https://books.ub.uni-heidelberg.de/arthistoricum/catalog/book/774



CHALLENGES IN DEALING WITH VIRTUAL REALITY

- Theory of virtual spaces and their manifestations
- Reflecting on historical conditionality and aesthetic aspirations
- Expanding Virtual Reality as an experimental field for research theses
- Standardise and automatically evaluate paradata

- History and Theory of Virtual Spaces
- Current positions on the concept of space and its relevance for the 3D modelling of historical spaces
- London Charter and the Sevilla Principles
- Basics and good practice examples of the visualisation of historical information in 3D and 4D
- Possibilities of textual labelling and visual annotation of simulations and reconstructions
- Relevance of Paradata in (and to) Virtual Objects and Spaces

- Creation of a documentation strategy for the virtual reconstruction or simulation of historical spaces
- Creation of a virtual room with the help of a CAD or 3D modelling programme
- Reflection on the accuracy, (in)safety and aesthetic effect of the realisation of a virtual space

What does the London Charter regulate? Name two principles!

Slide 39–67

What are the characteristics of a convincing VR environment?

Slide 19–28

What are paradata? Develop a documentation strategy for the virtual reconstruction of a building!

Slide 54–67

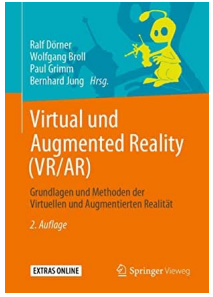
What possibilities does Virtual Reality offer the humanities? Compare VR with traditional methods of visualisation.

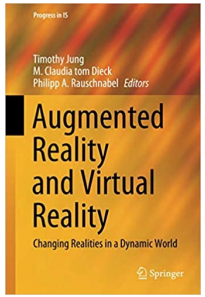
Slide 2–16

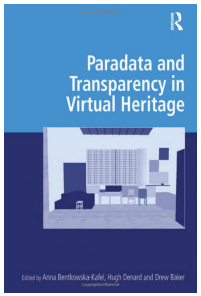
Give an example of a good implementation of Virtual Reality in the cultural sector! What distinguishes the project?

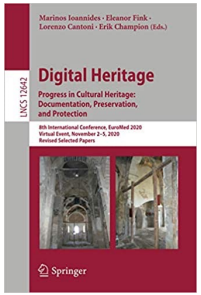
e.g. Slide 80–95

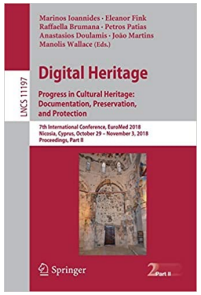
What do you think a good visualisation of a heritage site should contain?











Ralf Dörner u.a. (Hrsg.), Virtual und Augmented Reality (VR/AR): Grundlagen und Methoden der Virtuellen und Augmentierten Realität, 2. Auflage (Springer Vieweg 2019).

Timothy Jung et al. (eds.), Augmented Reality and Virtual Reality. Changing Realities in a Dynamic World (Heidelberg: Springer, 2020)

A. Bentkowska-Kafel – H. Denard – B. Drew (Hrsg.), Paradata and Transparency in Virtual Heritage (Farnham: Ashgate 2012).

Piotr Kuroczyński, Mieke Pfarr-Harfst und Sander Münster (eds.), Der Modelle Tugend 2.0. Digitale 3D-Rekonstruktion als virtueller Raum der architekturhistorischen Forschung (Heidelberg: arthistoricum.net, 2019): https://books.ub.uni-heidelberg.de/arthistoricum/catalog/book/515

Marinos Ioannides u.a. (Eds.), Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection, 8th International Conference, EuroMed 2020, Virtual Event, November 2–5, 2020, Revised Selected Papers (Heidelberg: Springer, 2021). *s.a. auch die früheren Bände*

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IMPRESSUM

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https://www.uni-goettingen.de/digitalhumanities

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