

Heritage & Architecture MSc3  
Studio Heritage4all | Universities | HEVA  
AR3AH105

Mick Bloemendal | 4296281

## RESEARCH PLAN

# Involving stakeholders in the design and decision-making process for the redevelopment of heritage museum buildings

The case of Prinsenhof museum Delft

Design mentor: Alexander de Ridder | [Alexander.deRidder@tudelft.nl](mailto:Alexander.deRidder@tudelft.nl)  
Research mentor: Bruno de Andrade | [B.deAndrade@tudelft.nl](mailto:B.deAndrade@tudelft.nl)



Index

Introduction..... 3  
    Fascination for the chosen studio and site ..... 5  
Problem statement..... 6  
Research questions ..... 10  
    Main research question..... 10  
    Sub-questions:..... 10  
Theoretical framework..... 11  
Methodology and methods..... 13  
    Research methodology..... 14  
    Applied research..... 15  
Arguments on relevance ..... 16  
Bibliography..... 17

## Introduction

This research plan is developed as a requisite for the master graduation project in Heritage & Architecture, under the chosen studio “Heritage4all: Univer-Cities”. This research plan will present the chosen research topic and it’s corresponding problem statement and research questions. Furthermore it will address the theoretical framework, the methodology and methods that will be used together with arguments on the relevance of the chosen topic. The first semester will consist mostly of research, while the second and final semester will be focussed on creating a design that is aligned to the research done. In other words, the first semester will focus on research for design while the second semester will also focus on design research (Laurel, 2003).

The studio Heritage4all focusses on the collaboration between all the different stakeholders involved in a debate over the conservation and development of buildings and it’s surroundings, from residents to the municipality, all interested parties should be involved in the process. This process is denominated as co-creation, on of the main driving factors of this studio. In order to intervene at an heritage site that needs to be redeveloped, it is important to involve the stakeholders related to the site. This way the design will be a result of the co-creation between all the stakeholders and thus will be base on arguments made by people that will actually use the site or are related tot the site in some way.

The chosen site that will be used as a case study is the *Prinsenhof museum* in Delft and the main research question will be: “*How to involve citizens into the adaptive design process of heritage museum buildings?*”

The aim is to have co-creation design workshops with the stakeholders, using the block-building game of Minecraft, to define the problems and values of the site found important by the stakeholders (de Andrade, Poplin, & Sousa de Sena, 2020). The expected result is to compile design ideas from stakeholders structured on a values assessment (Tarrafa Silva & Pereira Roders, 2012) in order to define a design concept to be further developed in the next semester.

The Heritage4all studio addresses 4 main research themes (see figure 1), these themes will be the underlying base of the research done by the students. These themes are:

- *Co-creation*
- *Digital Heritage*
- *Univer-Cities*
- *Sustainability*

### *Co-creation (Who/What)*

There are 4 types of customer co-creation: co-designing, collaborating, submitting and tinkering (O'hern & Rindfleish, 2010). For this studio and our field of knowledge we will mainly focus on the co-designing part of co-creation. Meaning that we as designers work together with all the other stakeholders, who don't necessarily have a background in design, in the design development stage. As stated in the studio manual (TU Delft, 2020): “*We define co-creation design as an approach that brings together experts and Univer-Cities stakeholders for co-designing sustainable development scenarios based on heritage values (economic, social, ecological, political, scientific, age, aesthetical and historic).*”

### *Digital Heritage (How)*

The introduction of digital technologies added a new layer of heritage to the built environment, also known as Digital Heritage. This new field of research is mentioned by UNESCO as following:

*“The digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources”* (UNESCO, 2009).

This research will focus on using Digital Heritage, games in particular, as a new communicating language together with stakeholders. The block-building game of Minecraft is chosen for this application since it is a digital building game where players can build anything they envision (de Andrade, Poplin, & Sousa de Sena, 2020). Furthermore, Minecraft players can place, demolish and interchange coloured and textured blocks of 1x1x1m all through a simple and understandable user interface. Exploring the use of Minecraft as a communication tool to involve stakeholders in the co-design and decision-making processes is something this research will elaborate upon.

### *Univer-Cities (Where)*

The term Univer-Cities is used for cities and univercities that have a symbiotic relationship together. In other words, the university and the city are depending on each other to flourish together (Teo, 2015). As stated in the conference on Univer-Cities in 2015: *“Universities are an important cornerstone of modern societies. By 2050, it is estimated that three-quarters of the world’s population will live in urban areas. Universities in the 21st Century will, therefore, play a catalytic role in pushing growth frontiers for major cities (Teo, 2015)”*. Considering this statement, universities will play an important role in the development of Univer-Cities. Univercities are becoming more internationally aimed and it is a challenge to stay rooted in the local and regional context.

Concluding, the univercities play a vital role in the host city developing but considering univercities becoming more international oriented it is a challenge to upkeep the relationship with the host city (Teo, 2018). For this research the aim is to create a mutual beneficial relationship between the TU Delft campus and the Prinsenhof museum.

### *Sustainability (Why)*

Sustainability should always be one of the goals in a design process. With the current climate change and ecological decline of the past decades, we as designers are obliged to create sustainable solutions with our designs. Sustainability is a concept that can be interpreted in a lot of ways, for this research the concept of sustainability is about creating a zero carbon redesign while keeping the values of the heritage building. More specifically, another topic of sustainability, the efficient use of land, is something this research will focus on. By implementing mixed use and shared space, buildings can have multiple functions. For instance, a residential building with retail on the ground level ensures that the building is in use at any moment throughout the day.

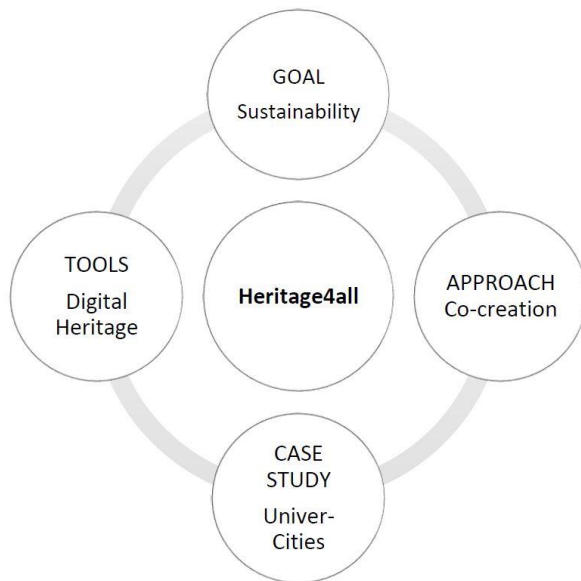


Figure 1 – Topics of Heritage4all - (TU Delft, 2020)

## Fascination for the chosen studio and site

### *Studio*

My choice for this studio was based on my interest for using new techniques in the architectural world. I always felt that games in particular have so much more potential than just entertainment alone, especially creative/creating games could be of great importance for our field of work in my opinion. My current thought on the process of involving stakeholders in architectural projects consists of stakeholders meeting and debating in the community centre once in a while to express their feelings. For me this feels like an obligatory process where everyone can have their say but no one will truly be heard, or maybe the ones that are represented the most or scream the loudest. Using something accessible like games where people can come together in online environments where everyone is equal and are able to express their needs by creating, seems a lot closer to truly involving stakeholders to me. This thought made me decide to choose this studio and I am excited to see if my assumptions on using games in architecture will be valid.

### *The chosen site*

The heritage site I chose for redeveloping during the design phase is the Prinsenhof museum in Delft. Therefore the research will be the base for this redevelopment design assignment. The reason for choosing the Prinsenhof museum has to do with the fascination I have for the place. Each day I walk past the Prinsenhof museum in Delft to do my groceries. Most of the time it's just another route to take in the city centre of Delft but sometimes, very rarely, I stop to admire the historical place and the historical event that happened at this specific location. When I go grocery shopping with friends or family I often stop at the Prinsenhof museum to tell them that Willem van Oranje, the founder of the Netherlands as we know it today, was murdered here. To my great surprise most people had no clue such a relevant historical event had unfolded itself there some 500 years ago and that sparked my interest. How could a place so important to the history Delft and the Netherlands be so hidden away in the cityscape of Delft?

## Problem statement

### Personal experience and expert interviews

After reading the vision document made by the Prinsenhof museum and the conversation expert interviews together with my own experience of the place, the main problems of the Prinsenhof museum became apparent. My own experience of the museum being hidden away in the cityscape of Delft is backed by the Heritage Department of the municipality of Delft, in particular the interview with monument advisor Ilse Rijnveld (see appendix). Besides that, Rijnveld also stated that the museum in general needs modernizing, however, since the building is a listed monument the opportunities are limited. Also the museum routing inside and out should also be improved, people currently aren't able to find their way and the accessibility for elderly people is not adequate as stated in the vision made by the Prinsenhof museum (Moerman, 2017).

Besides the poor visibility and accessibility of the Prinsenhof museum, the visitors diversity is also an issue. The annual report of the Prinsenhof museum shows the visitor numbers and from which societal group they originate, here it became apparent that from the 6752 educational visitors only 220 visitors were students (Museum Prinsenhof Delft, 2019). For a campus city as Delft the number of students this important heritage museum is able to attract is strikingly low. Delft has approximately 103.000 inhabitants from which 15.500 are TU Delft students (15,5%) (Kences, 2019). Furthermore the Prinsenhof museum also aims to make the collection available for more people through digitalizing of the collection and using new techniques to engage visitors (Museum Prinsenhof Delft, 2019).

On top of these statements, some interesting challenges derived from the talk with Alexandra den Heijer. Alexandra den Heijer is a professor at the TU Delft from the chair of Management in the Built Environment and specifically focussed on Public Real Estate. Den Heijer also does research on campus real estate and the future of the university and campus. She stated that heritage buildings, and specifically heritage buildings in the inner city of Delft, have some unique qualities that the TU Delft campus lacks. These heritage buildings can offer the campus spaces and qualities that will be perfectly suited for formal activities and meetings for instance. However, some more research should be done to truly find out which qualities the Prinsenhof in particular has to offer the TU Delft campus and vice-versa. Since the campus is lacking unique spaces (see appendix) and the Prinsenhof is struggling with attracting students (Museum Prinsenhof Delft, 2019), there's an opportunity to explore the possibilities for a mutual beneficial relationship between these two educational ensembles. A mutual reinforcement of historic and scientific values, respectively Prinsenhof museum and TU Delft, will unfold a design strategy based on the concept of Univer-Cities (Teo, 2018).

### Literature research

After the positions of the municipality, TU Delft campus and the board of the Prinsenhof museum were made clear, it was time to conduct literature research to discover what research already has been done on these topics. Together with the previous research on expert interviews and desk work, the aim of the literature research is to both confront these references and identify or confirm the research gaps between the current state of redesign of museums (*i.e. the problem*) and the desired state (*i.e. the goal*).

The search terms used on "Scopus", one of the largest databases for access to abstracts and papers, to conduct the research were:

**(Museum + Heritage) + X**

X= Engaging / Involvement / Awareness / Students / Co-creation

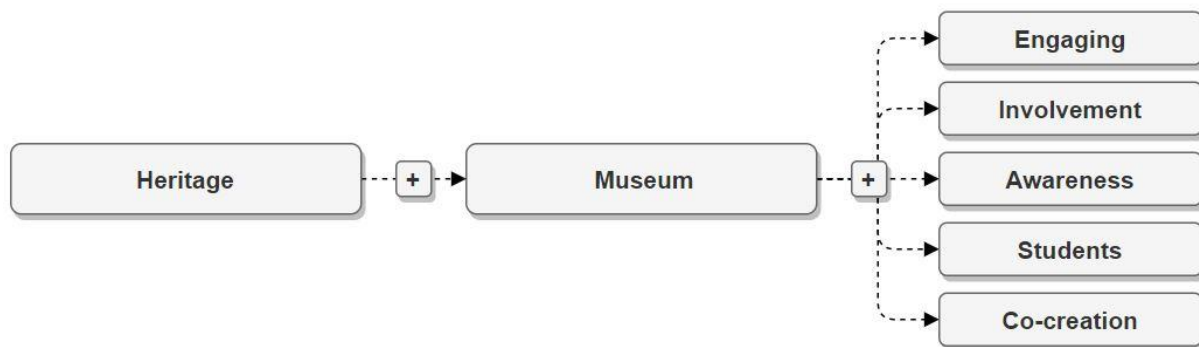


Figure 2 – Research terms - self made

To clarify the search combinations; the terms “Museum” and “Heritage” were always included in the search process since the research has to be relevant for heritage museum buildings like the Prinsenhof museum. Besides these two terms, one of the terms labelled as “X” above, were used in combination to find more specific research related to the research topic. The papers excluded were mainly focussed on the development of either the museums website or application. Since this research is aimed towards the design process of the museum itself and not on developing a museums website or application these papers were not of interest for this research. Eventually seven papers that came up proved to be useful.

Interestingly, almost all of the papers found were concentrated on involving stakeholders, using co-creation or co-design, in the decision making process during the development on new exhibitions for the museum in question. For instance Petrelli (2016) states in her research: *“The full integration of technology with the exhibition or heritage requires approaching the design of the visitors’ experience as a collaborative project that combines curatorial, technical and design aspects (pp.1).”*

On top of this, almost all the papers referred to using new technologies such as augmented reality, virtual reality and games to improve the co-design process; even if the search terms used didn’t include terms like technology, gaming or augmented reality. The importance of using these new techniques in the “new” field of digital heritage mentioned in research done by Pisanu and Sanjust (2018): *“This new field combines the traditional areas of expertise of heritage management, archaeology, history, museology with the great new digital information technology tools and has a big potential to face the new challenges of the heritage sector (pp. 2).”* For the methodology of this research, explained later, the use of these techniques will play a relevant role as well.

Later, to explore the base on which the literature found was built upon, cross referencing their references appeared to be valuable. This way the foundation of the literature found became apparent. The method used was counting how often a researcher appeared in the reference lists of the literature found and compiling them in a table. Only when a researcher came forward more than two times they got added in the table. The results of cross referencing the references used by the seven papers found on “Scopus” are summed up in the table below:

Reference	Amount
Cioffi, L.	8
Falk, J.	8
Hornecker, E.	8
Petrelli, D.	8
Marschall, M.	6

Van Dijk, D.	6
Dudley, S.	3
Fuks, H.	3
Hein, G.	3
Hooper-Greenhill	3

Table 1 – counting researchers – self made

Falk, J., Hornecker, E., Petrelli, D. and Ciolfi, L. came forwards the most; eight times. These researchers focus mostly on the potential of collaborative interactions in (heritage) museums, matching the search terms. Petrelli, Hornecker and Ciolfi for instance did research on the opportunity of new technology to advance the visitors' physical museum experience (Petrelli, et al., 2013). While Falk is focusses more on the shift in educational institutes, free-choice learning and how museums play a crucial role in educating citizens, he states:

*“Societies are becoming nations of lifelong learners supported by a vast infrastructure of learning organizations. The centres of this learning revolution are not schools, but a network of organizations and media (**museums**, libraries, television, books, and increasingly the Internet) supporting the public's ever-growing demand for free-choice learning – learning guided by a person's needs and interests”* (Falk & Diekring, 2005).

Therefore, it is crucial to keep museums vital and relevant, new technologies can assist in making this happen.

#### Research gap

Using co-design and augmented reality in museums to create interactive experiences is the general topic of the state-of-the-art-research done. A critical note on this topic is the fact that these papers are mostly focussed on the actual exhibitions of the museums, not necessarily on the museum building or ensemble. The research done on the use of co-creation in design processes aimed towards the redevelopment of heritage buildings is lacking.

There is a gap in the research done over the implemtation of new technologies (VR/AR/Mixed-Reality) as tools for the collaborative redesign of heritage buildings and sites. Petrelli et al. (2014) already showed in their research that co-creation with the use of workshops including multidisciplinary teams are of great value for creating a common understanding on what needs to be done. However this co-creation process was solely aimed to create more interactive museum installations and not for architectural design and decision-making.



### Problem statement summed up

#### **Ilse Rijnveld (monuments advisor at the municipality of Delft):**

- Museum needs to be modernized
- Museum is hard for people to find, hidden away in the city of Delft
- Inner and outer routing of the museum should be improved

(Transcript of interview with Ilse Rijnveld reference)

#### **Alexandra den Heijer (chair Management in the Built Environment / Public Real Estate / Campus)**

- Opportunity for heritage (museum) buildings and the TU Delft campus to have mutual beneficial relationship.
- Heritage (museum) buildings can offer the campus unique spaces.
- Campus can offer to raise awareness on these buildings and thus attract more visitors.

(Transcript of interview with Alexandra den Heijer reference)

#### **Board of the Prinsenhof museum**

- Want to improve the diversity of the visitors (more students and elderly people)
- Elderly people have trouble with the accessibility of the building and the collection
- The collection needs to be available for more people, modern techniques to digitalize the collection is the aim

(Moerman, 2017)

#### **Literature research**

- Showed the potential of using co-creation and new techniques in design- and decision making processes (Pisanu & Sanjust, 2018) (Petrelli D. , 2016) (Petrelli, et al. 2014).
- Research on using co-creation from the start of a design process aimed towards redeveloping heritage buildings is lacking.
- Research on using new techniques such as augmented reality the design process aimed towards redeveloping heritage buildings is lacking.

## Research questions

For the research questions it's important to keep the four fundamental pillars of Heritage4all-Universities in mind, namely:

- Co-creation
- Digital Heritage
- Universities
- Sustainability

The part of the sub-question that relates to either one of these pillars will be highlighted in the same colour.

### Main research question

**How to involve citizens into the adaptive design process of heritage museum buildings?**

#### Sub-questions:

How to raise awareness on citizens about the cultural significance of the Prinsenhof ensemble, in particular historic, social and scientific **values**?

How to use **co-creation** (digital games/gaming tools) to involve stakeholders in the redevelopment of heritage museum buildings?

What will be the advantages and disadvantages of using **digital games** for the redesign and decision making process of the Prinsenhof museum?

How does the quality of the Prinsenhof ensemble contributes to the needs of the **TU Delft campus**?

How to engage museum visitors by applying **new technologies** and **mixed use** in the design program?

## Theoretical framework

This chapter will explain key concepts and theories that will support the research.

### Theory on the societal role of heritage museums

The International Council of Museums (ICOM) defines museums as a “non-profitable, permanent institution in the service of society and opened to the public, which acquires, preserves, studies, exhibits and disseminates the tangible and intangible heritage of Mankind for study, education and recreation purposes” (ICOM, 2007).

UNESCO described the goal and outreach of heritage museums in special edition of “Museums and Heritage” of the periodic magazine “Culture & Development” aimed to the reflection, exchanges and dissemination of ideas and issues related to heritage and development of communities. In effect, museums and cultural centres are:

*“Museums and cultural centres as spaces to pass on cultural values, thus preserving and disseminating heritage, providing knowledge about other cultures, promoting cultural diversity and reinforcing both involvement and identity of their communities, with due regard to the fact that they constitute, moreover, assets of the cultural sector contributing to investment, economic benefits and job generation” (Hooff, 2012).*

This implies that the role of a museum is not just to be a place to exhibit art or artefacts, but also to reinforce both the involvement and identity of their communities. This research will built upon this role of the museum by using co-creation in the redevelopment of the Prinsenhof museum. The aim is not solely making sure all the stakeholders are being involved and heard, but also to create a museum community and thereby strengthening the position of the Prinsenhof museum in society.

### Theory on games

Studies on game-based learning in museums show the potential of using games and other new technologies to make the museum visit more engaging. Cosović & Brkic (2019) made an analysis using relevant literature, peer-reviewed articles and research studies to identify the pros and cons of using games in a learning environment such as museums. Such review resulted into the following table:

<b>Pros:</b>	<b>Cons:</b>
1. Positive effect of games on learning	1. No guidelines on how to integrate games in education curriculum
2. User engaged in a stimulating environment	2. Learning by gaming is still not recognized by formal educational systems
3. User rewarded for the accomplishment	3. Little available knowledge on current trends and use of applications of serious games for museums
4. Games fulfil educational needs	4. Lack of game mechanics, aesthetics, educational results, and museology features all in one
5. Games designed to complement, enhance, or augment the museum experience	5. No clear definition of the learning effects and how it is measured
6. Users can immerse into the virtual 3D museum	6. Designing games for different spaces of cultural heritage is considered to be multi-factorial and complex
7. Users can build and display their own virtual collections	7. Users overwhelmed if too many artworks are introduced simultaneously – attention span
8. Serious games based on multi use virtual environment (MUVE) in learning tasks can encourage collaboration (team-work)	8. Not-so-simple navigation
	9. The cost of developing high-fidelity virtual environments

Table 2 – Pros and cons of using game-based learning. Copied from “Game-Based Learning in Museums – Cultural Heritage Applications”, by Cosović & Brkic (2019).

Table 2 shows how valuable game-based learning can be in a learning environment; even more so it proves the value of using these new techniques in engaging and stimulating visitors. For this research the use of games, in particular the block-building game Minecraft, will be applied for the co-creation

design and decision-making process of the redevelopment of the Prinsenhof museum together with stakeholders in the city of Delft, South Holland, the Netherlands. Minecraft is a block-building game that uses over 500 coloured blocks, scaled approximately 1x1x1m, which players can place and remove to build creative structures. These structures can literally be anything as stated by de Andrade, Poplin & Sousa de Sena: “It enables the player to create the environment that represents a place, a city, a landscape, a continent or even the planet Earth” (de Andrade, Poplin, & Sousa de Sena, 2020).

### Theory of values

In order to frame the theory round values, Pereira Roders (2007) and Tarrafa Silva and Pereira Roders (2012) will be the main references. Tarrafa Silva and Pereira Roders (2012) made a list categorizing all cultural values:

	Secondary Values	References
Social	Spiritual	beliefs, myths, religions (organized or not), legends, stories, testimonial of past generations;
	Emotional, individual	memory and personal life experiences;
	Emotional, collective	notions related with cultural identity, motivation and pride, sense of “place attachment” and communal value.
	Allegorical	objects/places representative of some social hierarchy/status;
Economic	Use	the function and utility of the asset, original or attributed; the asset’s expired function, which has its value on the past, and should be remained by its existence (of materials), option (to make some use of it or not) and bequest value (for future generations);
	Non-use	the role that might be have for contemporaneous market, mainly for tourism industry;
	Entertainment	oriented to publicizing financially property;
	Allegorical	the education role that heritage assets may play, using it for political targets (e. g. birth-nations myths, glorification of political leaders, etc.);
Political	Educational	made part of strategies and policies (past or present);
	Management	it is part of strategies for dissemination of cultural awareness, explored for political targets;
	Entertainment	emblematic, power, authority and prosperous perceptions stem from the heritage asset;
	Symbolic	heritage asset as a potential to gain knowledge about the past in the future through;
Historic	Educational	quality of an object to be part of a few or unique testimonial of historic stylistic or artistic movements, which are now part of the history;
	Historic-artistic	quality of an object to be part of a few or unique testimonial that retains conceptual signs (architectural, urban planning, etc.), which are now part of history;
	Historic-conceptual	fact that the object has been part/related with an important event in the past;
	Symbolic	connected with Ancient civilizations;
Aesthetical	Archaeological	original product of creativity and imagination;
	Artistic	product of a creator, holding his signature;
	Notable	integral materialization of conceptual intentions (imply a conceptual background);
	Conceptual	authentic exemplar of a decade, part of the History of Art or Architecture;
Scientific	Evidential	original result of human labour, craftsmanship;
	Workmanship	skillfulness on techniques and materials, representing an outstanding quality of work;
	Technological	integral materialization of conceptual intentions (imply a conceptual background);
	Conceptual	craftsmanship value oriented towards the production period;
Age	Workmanship	piece of memory, reflecting the passage/lives of past generations;
	Maturity	marks of the time passage (patine) presents on the forms, components and materials;
	Existential	harmony between the building and its environment (natural and artificial);
	Spiritual	identification of ecological ideologies on its design and construction;
Ecological	Essential	manufactured resources which can either be reused, reprocessed or recycled;
	Existential	

Table 3: The cultural values. Copied from: “*Cultural Heritage Management and Heritage (impact) Assessments*”, by Tarrafa Silva & Pereira Roders (2012).

This research will mainly focus on the Historic, Social and Scientific values mentioned in table 3 since these are the relevant values related to this research on the topic of redesigning the Pinsenhof museum.

### Theory on digital heritage

Digital heritage is a way of preserving cultural or natural heritage through the use of digital media, as UNESCO states on their website:

Using computers and related tools, humans are creating and sharing digital resources – information, creative expression, ideas, and knowledge encoded for computer processing - that they value and want to share with others over time as well as across space. This is evidence of a digital heritage. It is a heritage made of many parts, sharing many common characteristics, and subject to many common threats (UNESCO, sd).

Furthermore, in the Charter on the Preservation of the Digital Heritage, the definition of digital heritage is mentioned as followed: “The digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources” (UNESCO, 2009).

The goal of preserving digital heritage is to make sure that it will be accessible for the public. However the hard- and software used to produce digital heritage is deteriorating quickly. Therefore, reliable software is needed to ensure digital heritage can be preserved (UNESCO, 2009). Minecraft could play a role in this challenge since the immense popularity of the game guarantees a long life span of the software used.

For this research digital heritage will be mainly related to the use of games as a tool to both document and preserve heritage digitally and facilitate the co-creation design and decision-making process.

### Theory on sustainability

Sustainability and heritage are closely link to each other in this research. Such intersection, is aimed at preserving resources through stakeholders inclusion:

One of the most significant definitions of “sustainability” is reflecting the importance of economic, environmental and social factors in decision-making. Heritage is closely linked; identity, culture and preservation contribute to the durability of supply and reinforce stakeholder inclusion and economic, social, environmental and cultural dimensions (Ran & Han, 2018).

Therefore sustainability is framed in this research in such a way that the heritage building and the ecological environment will benefit from it. This means, for instance, applying mixed use as a method of maximizing the efficient use of space. Or even adding gardens that renew and produce top soil at the location of Prinsenhof. Sustainability will be an important matter during the workshops, attendees will be asked to come up with sustainable solutions and to define what sustainability means for them. This way the term sustainability will be made more concrete so the end users will benefit from a sustainable building, which not only preserves historical values but also the ecological values.

## Methodology and methods

The goal of the research is to use co-creation approach through workshops with specific stakeholders related to the debate of the development of the Prinsenhof building complex. The architectural “*epistemes*” of this research are; the *Morphology* of the Prinsenhof ensemble and the *Praxeology* of the citizen engagement on the Prinsenhof museum. This will result in a case study, analysing the Prinsenhof ensemble and using co-creation as a research tool. The workshops aims at revealing what stakeholders find of value in the Prinsenhof ensemble together with what they see as a problem or challenge. The workshops also aim at finding out how the stakeholders see and create design solutions for the redevelopment of the Prinsenhof museum. Finally, after evaluating the research and workshops done, the goal is to form a foundation on which the design assignment for the redevelopment of the Prinsenhof will be based.

### Methods

- Fieldwork

- Expert-interviews
- Archives studies
- Secondary literature
- Modelling
- Workshops

### Tools

- Minecraft
- Geogames
- Transcripts
- Zoom-recordings
- 3D design software (Revit/SketchUp/CAD)
- Physical models

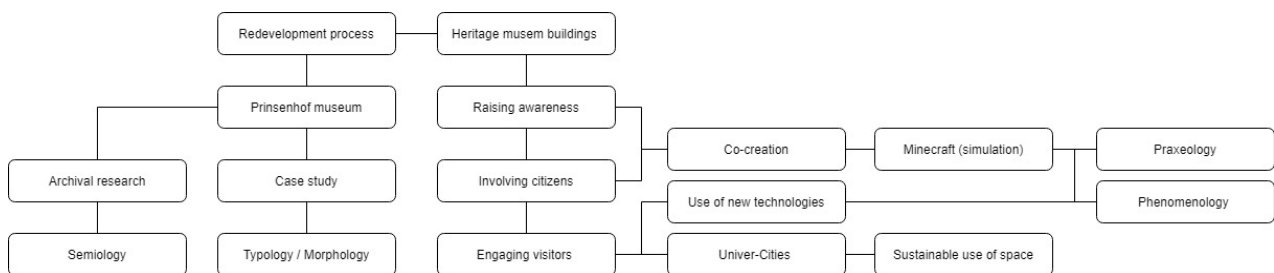


Table 4 – Overview of the research topics, approaches and epistememes – self made

## Research methodology

### Data collection and analysis

#### History of the Prinsenhof museum

Materials like technical drawings, floorplans and photographs made through the years will be retrieved at the archive (Stadsarchief Delft). The material retrieved from the archive will be analysed. Also an analysis will be made on the urban area surrounding the Prinsenhof.

#### Listing process of the Prinsenhof museum.

Since the Prinsenhof museum is a listed building, research will be done on the listing process of the museum. Understanding the listing process of the Prinsenhof museum will give insight into the acknowledged values and attributes of the building. Also the reasoning why the Prinsenhof is a listed monument will become apparent; values, attributes, stories, materials, spaces, etc. can all be part of that reasoning. Besides it being important to know *why* and *how* the building was listed, it's also crucial to discover *which* specific elements of the building are protected. This way all stakeholders can keep these protected elements in mind during the co-creation sessions. This research step will result in making a value assessment for the Prinsenhof museum to have a clear vision on the acknowledged values. The method used for this value assessment will be the “*cultural values table*” used by Tarrafa Silva and Pereira Roders (2012). This value assessment will also contribute in answering the sub-question: “*How does the quality of the Prinsenhof ensemble contributes to the needs of the TU Delft campus?*”

#### Expert interviews, case studies and analysis

More extensive research will be done to find more literature supporting the main- and sub-questions of the graduation project. The aim is to obtain more information on new techniques, such as augmented reality and gaming, used to involve and engage citizens in the design process (co-creation) aimed towards redeveloping heritage buildings. This will result in expert interviews with both professionals

specialized in new technologies (AR, VR, (geo)gaming, etc.) and professionals specialized in the redevelopment of heritage buildings. The topic during these interviews will be what games and other new technologies can support the redevelopment process of heritage buildings; and thus will be answered by both sides of the spectrum.

Also finding out what the pro's and cons are during the co-creation process by researching case studies that used co-creation (Petrelli D. , 2016) (O'hern & Rindfleish, 2010) (Claisse, Ciolfi, & Petrelli, 2017). Finding and studying on practical examples of heritage (museum) buildings which have mixed use, making a SWOT analysis on applying mixed use in heritage buildings. Examples of these buildings were mentioned by Alexandra den Heijer namely: the Domtoren in Utrecht and the town hall of Delft (transcript of expert interview with Alea den Heijer).

## Applied research

### Preparing the workshops

The workshops will make use of Minecraft as a tool to facilitate the co-creation design and decision-making process. Minecraft is a creative building survival game, for these workshops only the creative aspect of the game will be applied. Therefore it's needed to model the specific site, in this case the Prinsenhof ensemble, in the game. Spatial data modelling will be used, this data will be imported into Minecraft to create a very basic 3D environment. After this basic Minecraft environment is made, the details and materials will be manually placed in. The end result will be a Minecraft environment which will look just like the Prinsenhof. However, Minecraft makes use of blocks scaled roughly 1x1x1m, therefore the size of these blocks determine the smallest scale possible in the environment. This way only the essential elements will appear in the model. After putting in all the details and materials, the Minecraft environments will be ready for the workshops.

### Pre-workshops

Before initiating the workshops together with the stakeholders, first it's valuable to test the workshop format. This will be done with students from the TU Delft who are interested in the research topic. The attendees will play a role playing game where each attendee represents a stakeholder related to the Prinsenhof museum. As Armstrong (2002) proved: "Role playing can be used to forecast decisions (pp.1)". The aims for this testing phase are: get used to leading a workshop, get used to the game used for the workshops (the game of Minecraft) and gain feedback from the attendees. After the feedback, the workshops will be evaluated and adjusted for the actual Minecraft workshops with the stakeholders.

### Workshops

The stakeholders who will be invited for the Minecraft workshops are:

- Someone from the board of the Prinsenhof museum
  
- Someone from the municipality of Delft (Ilse Rijnveld will be invited or asked if she knows someone suited)
  
- Someone related to the TU Delft Campus (Alexandra den Heijer will be invited or asked if she knows someone suited)
  
- Someone related to *Prinsenkwartier*
  
- Someone from the action group "*Slag om Prinsenhof*"

- Local residents who live close to the museum from different age groups (children/grownups/elderly)
- Professionals, such as architects, related to the development of heritage buildings
- Students from the TU Delft

The aim of the workshops is to explore what the stakeholders find of value, and which problems they recognize for the Prinsenhof museum in Delft. Besides that, the workshops will make use of Minecraft as an analytical- and design tool to facilitate the co-creation process for the redevelopment of the Prinsenhof museum. Also the value assessment table used by Tarrafa Silva and Pereira Roders (2012) will be filled in by the attendees of the workshop. This way a clear overview is made for the overall consensus of the stakeholders involved.

### Reflecting

After the workshops, the results will be reflected upon. The design options made in Minecraft, together with the value assessment will form the base for reflection. The results will be weighted and evaluated in order to formulate a design concept that will be the base for the design phase of the development of the Prinsenhof museum in Spring Semester.

### Arguments on relevance

The argument on relevance for this research consists first and foremost of the fact that the Prinsenhof museum is in need of modernizing. Modernizing in the sense that the Prinsenhof museum wants to show the outside world that the museum is not only historical, but also contemporary. Therefore the skin of the building should translate what is happening inside (Moerman, 2017). Beside that, the museum wants new ways to engage visitors as well as improving the routing inside and out (Museum Prinsenhof Delft, 2019). Furthermore, as mentioned in the problem statement, the Prinsenhof museum aims to make the collection available for more people through digitalizing of the collection and using new techniques to engage visitors (Museum Prinsenhof Delft, 2019). This research will built upon the potential showed in the literature research of the use of games and new technologies for both engaging stakeholders in the design and decision-making process and to foster visitors beyond schoolchildren and local families. However current research is not aimed at implementing these techniques from the start of a co-design process for the redevelopment of a heritage museum building. Therefore more investigation on this will be needed.



## Bibliography

- Armstrong, J. S. (2001). Role Playing: A Method to Forecast Decisions. In J. S. Armstrong, *Principles of Forecasting* (pp. 15-30). Boston.
- Claisse, C., Ciolfi, L., & Petrelli, D. (2017). Containers of Stories: using co-design and digital augmentation to empower the museum community and create novel experiences of heritage at a house museum. *The Design Journal*.
- Cosović, M., & Brkic, B. R. (2019). Game-Based Learning in Museums - Cultural Heritage Applications. *Information, 11, 22*.
- de Andrade, B., Poplin, A., & Sousa de Sena, Í. (2020). Minecraft as a Tool for Engaging Children in Urban Planning: A Case Study in Tirol Town, Brazil. *ISPRS International Journal of Geo-Information: Special Issue "Gaming and Geospatial Information"*.
- Falk, J., & Diekring, L. (2005). Lessons without limit: How free-choice learning is transforming science and technology education. *Suplemento v.12, 145-160*.
- Groat, L., & Wang, D. (2013). *Architectural Research Methods*. Hoboken, New Jersey: John Wiley & Sons inc.
- Hooff, H. v. (2012). *UNESCO - Culture & Development: Museums and Heritage, 2012*, p. 3.
- ICCROM. (2020, 10 13). *inSIGHT: A participary game for enhancing risk governance*. Retrieved from [iccrom.org: https://www.iccrom.org/news/insight-participatory-game-enhancing-disaster-risk-governance](https://www.iccrom.org/news/insight-participatory-game-enhancing-disaster-risk-governance)
- ICOM. (2007). *ICOM Statutes* . Vienna.
- Kences. (2019). *Landelijke Monitor Studentenhuisvesting 2019*. Delft: ABF Research.
- Laurel, B. (2003). *Design Reserach: Methods and perspectives*. MIT press.
- Moerman, J. (2017, april). *Een plan voor de toekomst 2017-2022*. Retrieved from Museum Prinsenhof Delft: <https://prinsenhof-delft.nl/ruimtelijke-ontwikkelvisie>
- Museum Prinsenhof Delft. (2019). *Jaarverslag 2019*. Delft.
- O'hern, M. S., & Rindfleish, A. (2010). Customer co-creation. *Review of Marketing Research, 84-106*.
- Petrelli, D. (2016). Do it together: the effect of curators, designers, and technologists sharing the making of new interactive visitors' experiences. *Museum and the web 2016, 1-13*.
- Petrelli, D., Ciolfi, L., van Dijk, D., Hornecker, E., Not, E., & Schmidt, A. (2013). Integrating Material and Digital: A New Way for Cultural Heritage . *Interactions: new visions of human-computer interaction* .
- Petrelli, D., Not, E., Damala, A., van Dijk, D., & Lechner, M. (2014). EuroMed. *meSch - Material Encounters with Digital Cultural Heritage* (pp. 536-545). Springer International Publishing Switzerland.

- Pisanu, M., & Sanjust, P. (2018). REHABEND. *a user-centered immersive experience for heritage exploration*. Cácares, Spain.
- Ran, W., & Han, F. (2018). Indicators for Assessing the Sustainability of Built Heritage Attraction: An Anglo-Chinese Study.
- Tarrafa Silva, A., & Pereira Roders, A. (2012). Conference paper. *Cultural Heritage Management and Heritage (Impact) Assessments* (p. 6). Eindhoven: Eindhoven University of Technology .
- Teo, A. S. (2015). *Univer-Cities: Strategic View Of The Future From Berkeley And Cambridge To Singapore And Rising Asia, Volume II*. Singapore: World Scientific Publishing .
- Teo, A. S. (2018). *Univer-Cities: Strategic Dilemmas Of Medical Origins And Selected Modalities: Water, Quantum Leap & New Models - Volume III* . Singapore: World Scientific Publishing.
- TU Delft. (2020, 08 18). *AR3AH105 Graduation Studio Adapting 20th Century Heritage (2020/21 Q1)*. Retrieved from brightspace.tudelft.nl:  
<https://brightspace.tudelft.nl/d2l/le/content/278720/viewContent/1958065/View>
- UNESCO. (2009). *Charter on the Preservation of the Digital Heritage* . Paris: UNESCO.
- UNESCO. (n.d.). *concept of digital heritage*. Retrieved from unesco.org:  
<https://en.unesco.org/themes/information-preservation/digital-heritage/concept-digital-heritage>

