The archive is currently going through a process of dematerialization, where artefacts are losing their tangible qualities and becoming part of the digital realm, resulting in a space that has become redundant and perceived to be insignificant in the digital age.

The architectural archive of Boukunde holds valuable and significant cultural information but is currently inaccessible and has become an insignificant fractured space, as the result of its digital counterpart. The objective of this investigation is focussed on the analysis of the character of both the physical and digital archive in order to determine a new character for the concept of a cybrid archive.

This chapter focuses on establishing the connection between the paper archive and the digital archive, to define the re-representation of a new vibrant space, accessible to users, in a contemporary context. The chapter introduces the site and location for the application of the cybrid concept while emphasising the importance of the physical sensory spatial experience of the interior space through the use of a comparative analysis.
3.1 ARCHIVE

Archives are defined by The National Archives (2016) as an accumulation of documents or records selected for their long term cultural and historical value and these records are created by the activities of individuals or organizations over a period of time. Archive is also the physical place where these documents are kept and preserved. The International Council on Archives (2016) defines a characteristic of archives as being authentic, where usually only a single copy of a document exists, making it unique and therefore important to be properly stored, managed and preserved for current and future use. Archive is not only defined by paper documents and can take form in various digital or analogue media.

3.1.1 IMPORTANCE OF ARCHIVES

An archive is a reminder of the past, but more importantly, it is a source of knowledge, caution or inspiration for the future Barker (2016:6).

Barker (2016:6) states that international and locally legislated institutions manage and coordinate the preservation of artefacts for future use and the University of Pretoria is amongst many other universities in South Africa which houses architectural archives that contributes to the continuum of architectural work in South Africa.

The site and typology selected for the investigation of the connection between the digital and physical realm is the architectural archive of the University of Pretoria which was established in 1966. The archive is housed by Boukunde which acts as home to the Department of Architecture; the department accommodates three fields of study namely Architecture, Interior Architecture and Landscape Architecture.

The archive started with only a few drawings and has grown into a valuable collection of documents of almost 80 significant physical and digital archival collections which has been collected by staff members over the years. The archive committee of the department continues to actively engage in this endeavour to collect, index and digitize the archival material which holds significance to South African architecture.

The archival material consists of original drawings and portfolios from architectural practices which represent the legends of their time. At present the archive houses physical collections from architects like Norman Eaton, Gordon McIntosh, Herbert Prins, Philip Nel amongst many others. The archive also houses other physical artefacts such as an extensive slide collection, maps, photographs, documents about Pretoria as well as works of art. The physical archival collections are housed in Boukunde while the digitization of the material gives anytime anywhere access to the digital collections housed on the UP Space online platform. The architectural archive has a significant contribution to the education and research activities of the architectural department and the value of this information should be made more contemporary and accessible.

Barker (2016:9) explains that the aim of the departmental committee is to express the value of these architectural artefacts through continuous process of collecting, sorting, indexing and digitizing. The mission is to collect, curate and disseminate information that are or could be of value to interested parties and to focus on how to make material more accessible.

The Boukunde archive in its current state is unorganized and inaccessible, due to spatial limitations. The archive has become seemingly redundant in the contemporary context, refer to section 3.2.1 site analysis and comparative analysis, where the process of dematerialization has allowed for documents to be made more accessible through digital platforms. The result is the perception of a space filled with old dusty shelves and a lack of understanding and insight to the value of the archive. This is the residual effect of a fractured space, refer to Chapter 1 section 1.2.1, where the digital realm and physical realm have not been integrated and is deprived of its opportunity due to the lack of an innovative spatial resolution.

Although the paper artefacts are leaving the physical realm and forming part of the digital realm, the need to interact with and access the information remains and the vision of this design intervention is focused on re representation of what the archive could be in a contemporary context.

There are a few limitations that arise from the character of the digital archive which is the main driver of this study. With the scale of architectural drawings, there is a need to view the digital version in full scale and not be limited by the dimensions of a small computer screen. Investigation originated from the question of how can digital architectural drawings be perceived in context and full scale?

© University of Pretoria
WHAT IT IS...

WHAT IT COULD BE...
3.2.1 SITE ANALYSIS

The site for intervention is located in the Building Science building also known as Boukunde, which is located on the main campus of the University of Pretoria. Boukunde is home to the Department of Architecture, which accommodates three fields of study namely Architecture, Interior Architecture and Landscape Architecture. The focus of this study is placed on an operational purpose already found in the building as an extension of the educational typology.

Site parameters: The spaces dedicated to the preservation of the archive artefacts are currently located on the 1st floor of the building. These two rooms not intended for this purpose and therefore the confined spaces create limitations to the use and access of the architectural archive. Due to these limitations the archive artefacts are scattered into other spaces within the building such as the reading room. The artefacts stored in the reading room are not well preserved as the store room does not fulfil the requirements of an archive such as the control of temperature, light, humidity and security.

This dissertation investigates the relocation of the archive to the proposed site where requirements will be addressed accordingly. See figure 3.2.2 for the proposed location of the Boukunde archive. The reading room, the adjacent double volume crit space and the honours studio will be used as the site for the re-representation of the Boukunde archive. The current functions of the site will be adapted or moved to appropriate locations within the building.

Existing materiality: The existing material palette of the building consists of various rigid, hard and mismatched materials and colours. A unique feature of the building lies in the vertical, linear and repetitive forms and surface treatments, see the collection of photographs in figure 3.2.5 on page to the right, these are elements which should be taken into consideration for the interior intervention as response to the existing.

Volume: The double volume contributes to the unique character of the building, as it is a design element that manifests throughout the building see figure 3.2.5. The volume of the space holds potential for a novel design intervention and should enhance this characteristic of the building.

Light: Both the existing reading room and crit space are flooded with natural light entering from the skylights in the double volume as well as the north facing glass façade window as expressed in figures 3.2.10 and 3.2.19. During winter months directs sunlight enters the space which is undesirable as it creates glare on the floor surfaces. During summer the harsh sunlight is blocked out but the space remains extremely bright. The treatment of the northern window façade should be investigated to create a more desirable interior environment. The specific requirement for the lighting in the space will be discussed in Chapter 5 section 5.11.

Ventilation: Currently the existing office space and reading room do not have artificial ventilation and no effective natural ventilation although there are windows in the north facing facade there is no opportunity for cross ventilation. The existing honours studio is mechanically ventilated with south facing windows which do not have effective natural ventilation.

The current ventilation and climate of the space is not sufficient for the new use of the space, therefore opportunities and limitations identified in this section will be explored. The requirements for indoor environmental quality for an archive will be discussed in Chapter 5 section 5.11.
3.2.2 OPERATIONAL PURPOSE

The new Boukunde archive would house architectural drawings, documents, slides and photographs significant to the context of Pretoria which are currently found in the existing archive. The intention of the new archive is to accommodate the growth of the architectural collections and therefore larger spaces are required. Along with the architectural drawings, master dissertations and thesis documents will be kept in this archive as well as presentations of the master exam presentations that would be digitally uploaded and made accessible for educational purposes.

The archive is divided into two spaces; back of house which consists of the storage, preservation and processing of the archive artefacts, allowing access only to archive staff members and limited access to students and the front of house which will incorporate screens to access the digital archive material and presentations.

The intention of the re-representation of the Boukunde archive is to create a place for people, to access cultural information through a vibrant experience. The space should encourage meaningful conversation, debate, research, learning and interaction in a digital era.
3.3.1 CONVERSATION AND DEBATE

Conversation and Debate

This space could accommodate a variety of scenarios where group discussions and informal presentations can take place.

Users: Students, lecturers and other interested parties. Max 10 people

Furniture:
- Interactive screen table
- Vertical display screen
- Chairs

Spatial requirements:
- Lighting control
- Adaptable spatial element

3.2.2.2 RESEARCH AND LEARNING

The research space should be able to access information through informal researching and browsing of collections.

Users: Individual students, staff and other interested parties

Furniture:
- Seating
- Work surfaces

Spatial requirements:
- Visual access to processes and information

3.2.2.4 ARCHIVING

The archive processing space should allow for bulk sorting, inspection, indexing and digitizing.

Users: Limited to staff and interested parties on request

Furniture:
- Large tables
- Seating
- Scanner, printer, computer
- Digital display screen

Spatial requirement:
- Access control
- Sufficient lighting

3.2.2.5 STORAGE

The storage space should be adequate for the proper preservation of significant architectural drawings and documents.

Users: Limited to staff and interested parties on request

Furniture:
- Shelves
- Lay flat and hanging storage units
- Tables + Chairs

Spatial requirements:
- Controlled climate, humidity and light
- Access control

3.2.2.6 EXHIBITION

The exhibition space will create visual access to archive material as well as student work and design installation.

Users: Students, staff and interested parties

Furniture:
- Display cases
- Modular fittings

Spatial requirements:
- Open space
- Adjustable lighting
3.3 CONVERGENCE - CYBRID SPACE

With the emergence of digital technologies it was perceived as parallel worlds whereby Thackara (2001:40) explains that the physical and digital are coexisting in a hybrid space. The hybrid as defined by Thackara in Roscoe (2005:46) becomes the edge where the digital and physical realm come into contact with one another, but remain in conflict and unsettle the spatial character. The two realms, each with its own defined character is now present in one space, which requires both to actively engage with another in order to move toward a new spatial language. The manifestation of both the realms in a single space holds opportunity for innovative design application through the exploration of the potential connection. The fractured space as the effect of the distinct characteristics of each realm reveals this potential for the digital and physical to morph into something unfamiliar yet exciting as elaborated in the following quote by Roscoe (2007:102)

"Similar to the crafting or joinery of a material-to-material connection in the physical realm, the design of the threshold requires a different yet equally important level of attention to detail. The threshold between cyberspace and physical space becomes an area for careful study and complex joinery; it is an emerging area of design craft and detailing."

Emphasis is placed on the connection between the two realms, with the aim to create a seamless joinery for the new spatial language. Anders (2004:393) defines a new space where the digital and physical realm are merged into one composition, he denotes this space as the cybrid. The cybrid concept moves away from the edge condition of hybridization where the two realms have up to this point come into contact through the insertion of the one into the other, toward a new environment that integrates both. How the two realms come together to form this new spatial language becomes the threshold for design to create a seamless spatial experience. The most valuable characteristics are extracted from each realm and merged together to form a new character which would determine the identity of the cybrid space.

To place this concept of cybridity into the context of this study, the Boukunde archive becomes an ideal specimen for the exploration of the integration of the digital and physical. The cybrid concept will inform the character of the re-representation of the Boukunde archive, as it will fuse together the most valuable qualities of both the paper archive and the digital archive. The intention of the cybrid is to converge the Boukunde paper archive and its digital counterpart into a space where the one informs the other so they will no longer be perceived as two separate realms. It is important to consider the contribution of the interior designer in the process of creating the spatial language of the cybrid. The interior designer's responsibility lies in manipulating the physical spatial aesthetics in order to create a cohesive outcome. The architect or designer's responsibility therefore lies in manipulating the physical spatial aesthetics in order to create a cohesive outcome. The interior designer's responsibility therefore lies in manipulating the physical spatial aesthetics in order to create a cohesive outcome. It now becomes important for the designer to create a clear understanding of what the opportunities are for designing this threshold which merges together the paper archive and the digital archive into an appropriate contemporary environment.

Paper as the medium for exploration is used as the aesthetic link to the integration of the digital and physical realm holds opportunity to create an intriguing conversation which defines the cybrid archive. Refer to Chapter 4 section 4.2 for further elaboration.
3.3.1 COMPARATIVE ANALYSIS

The cybrid is no longer at the edge where the two realms encounter but a new environment that incorporates both. The comparative analysis is the first step in the process of determining the character of the cybrid and is used as a method to extract the most valuable qualities of each realm and integrate them into the new spatial language. Within the context of this study, the Boukunde Archive and the Beinecke Rare Book archive are used to analyse the character of the physical realm, along with the Carlo Scarpa online archive as precedent for the digital character.

The intention of this analysis is to investigate the overlapping characteristics as well as the gaps which would become the areas for further investigation. With logic reasoning, the most valuable characteristics from both the physical and the digital realm are extracted to be interpreted and integrated into the new cybrid realm.

3.3.1.1 BEINECKE ARCHIVE

According to Skidmore, Owings & Merrill (2016) the Beinecke Library is the largest building that is purely devoted to hold rare books and literary manuscripts which serves as a research centre for student, faculty and scholars of the Yale University. Perez (2010) describes the space when upon entering the space the six storey glass enclosed structure emphasizes the main purpose of the building. A mezzanine level allows people to move around the glass encased core which gives visual access to the archived books. The glass structure with the surrounding mezzanine creates visual access of the archive documents to the user of the space and therefore how the space is articulated becomes an important design consideration.

The purpose of the space is to store and preserve books and literary documents that are authentic and rare therefore, by definition, see Chapter 1 section 1.9 Defining terms, can be defined as an archive rather than a library.

The intention of this precedent is not to extract spatial qualities but rather to define possibilities of how the space is programmed. This precedent serves as a good example of the activities that could be incorporated into the new architectural archive of Boukunde. The space incorporates a variety of functions, Skidmore, Owings & Merrill (2016) explains that the levels below the plaza contain a catalogue and reference room, a reading room, staff offices and a sunken court. All of which are designed to throughout the building create an integration and accessibility to the archive.
3.3.1.2 CARLO SCARPA ARCHIVE

The Carlo Scarpa Archive is used as support to the characteristics extracted through the comparative analysis. The Carlo Scarpa Archive (2016) was formed with the help of a joint committee with the goal of increasing the awareness and conservation of Carlo Scarpa, Veneto architect’s work. The drawings, photograph, interactive models and documents are accessible to the public which allows for greater insight into the architect’s design process. Documents of high quality can be accessed directly on the website and sketches and drawings are photographed along a ruler to give the user a perception of the scale, but is limited to a screen of a device, refer to figure 3.3.6.

<table>
<thead>
<tr>
<th>BOUKUNDE ARCHIVE</th>
<th>SCARPA ONLINE ARCHIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Paper</td>
<td></td>
</tr>
<tr>
<td>Complex Spatial Configuration</td>
<td>Object</td>
</tr>
<tr>
<td>Sensory Experience</td>
<td></td>
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<tr>
<td>Tactile Interaction</td>
<td>Cognitve interaction</td>
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<tr>
<td>Nostalgic experience</td>
<td></td>
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<tr>
<td>Limited access</td>
<td>Anytime anywhere access</td>
</tr>
<tr>
<td>Co-presence</td>
<td>Lone activity</td>
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<tr>
<td>Static</td>
<td>Dynamic</td>
</tr>
<tr>
<td>Permanence</td>
<td>Transient</td>
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<tr>
<td>Context</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Preservation</td>
</tr>
</tbody>
</table>

Table 3.3.1 Comparative Analysis (Author.2016)
### 3.3.2 THICK DESCRIPTION

The characteristics analysed in section 3.3.1, Table 3.3.1 comparative analysis, will be elaborated to place within the context of the study.

**Presence of Paper:** The content of the architectural archive of Boukunde as well as the Beinecke archive manifests through paper. It is not the only medium present but it is the most significant one.

**Complex Spatial Configuration:** Sailer (2012) defines one characteristic of the physical realm as having a complex spatial configuration. The spatial configuration of the Beinecke archive carries narrative as it controls the perception of the space. Upon entering the space the visitor is met by two large staircases which ascend up to the mezzanine level where the glass encased book tower becomes the emphasis of the space, allowing visual access from any point. The operation, movement, articulation and lighting are amongst many complex elements required in such a space.

**Object:** Information in the digital realm is intangible, Van Campenhout (2013.2) states that although information is a physical thing it can only be perceived by a human by displaying it on a screen or device. The digital realm manifests through an object which gives opportunity for human perception.

**Sensory Experience:** Space is experienced as a whole through physical activities. Lighting qualities and vast volume created in the Beinecke Library contributes to the calm and still atmosphere of the space.

**Tactile interaction:** Interaction with the actual archive material contributes to the tactile experience of paper. Both the Boukunde archive and Beinecke archive create opportunity for these encounters where material can be physically accessed for research and learning. This interaction with the material stimulates the senses through the sound of paging through a book, rolling or unfolding a drawing as well as the smell of the collective paper artefacts.

**Cognitive interaction:** Information in the digital realm as described by Van Campenhout (2013.2) is intangible and has no shape therefore it is not suitable for human perception. It can only be perceived through mediation of a device and currently these devices appeal mainly to the user’s cognitive skills.

**Nostalgic experience:** An intangible characteristic of both the Boukunde archive and the Beinecke archive which allows the user to experience a sense of wonder and curiosity in the presence of the archive material. Individual pieces carry knowledge and narrative.

**Limited Access:** The Boukunde Archive is inaccessible to users; anytime access to material is limited to staff and students need to request material. Unorganized material as a result of the lack of proper spatial requirements and additional resources create limitations to the access of information. The size of the architectural drawings of the Boukunde Archive along with the spatial limitations create obstacles for the access of information.

**Anytime Anywhere Access:** The dynamic nature of the digital realm allows for anytime anywhere access. The Carlo Scarpa online archive gives access to the public through the convenience of personal computers, information/artefacts which could not have been accessed by an individual of another country if it has not been digitized.

**Co-Presence:** The presence of users in the space creates clarity and understanding for the operational purpose of the space. Sailer (2012) explains that the physical realm allows for a co-presence of people where interactions might occur.

**Lone Activity:** Although the digital realm allows society to interact and form networks, it remains an intangible activity. The action of accessing information of a device remains an activity done by the individual in her/his own space.

**Static:** Van Campenhout (2013.3) explains that objects and artefacts of the physical realm are static; they do not have the ability to suddenly change into something different. The Boukunde archive can be seen as a static space where the content and the spatial configuration do not have the ability to adapt to different requirements. The space as a unit of storage alone has become outdated in the digital era.

**Dynamic:** In contrast to the static nature of the Boukunde archive Van Campenhout (2013.3) states that information and data in the digital realm is dynamic, where information can be presented in different ways. The display of information can rapidly change its identity.

**Preservation:** The main purpose of the both Boukunde archive and the Beinecke archive is to preserve valuable documents and artefacts. The success of the Beinecke Library lies in its ability to preserve whilst at the same time providing access to material, whereas the Boukunde archive preserves artefacts by placing them in a storeroom of dusty shelves with limited access. Although artefacts are preserved, the damage that occurs through interaction with the material is certain.

**Context:** Being able to view the surrounding artefacts and operational purpose of the space allows the user to form an understanding of the space and its context.

**Scale:** With specific reference to the architectural drawings of the Boukunde Archive, the physical artefact not only allows a tactile interaction but also gives the true scale of the original artefact, where in contrast the digital archive, artefacts are limited to the size of the screens they are viewed on.

**Transient:** The transient nature of the digital realm gives it the ability to disappear and reappear out of the blue as described by Van Campenhout (2013.3), and he explains that computers have a very distinct on/off nature which creates a discontinuous effect whereas an object of the physical realm has a continuous presence.
3.4 PRECEDENT STUDY

Three precedent studies were done to investigate the integration of the digital realm into a contemporary library space, which houses similar functions as the proposed archive space, to store and access information. The third precedent is chosen not for similar operational purpose but rather for the integration of both the physical and digital realm into a single experience.

3.4.1 KANAZAWA UMIMIRAI LIBRARY

Kanazawa, Japan
2011
Coelacanth K&H Architects

Archdaily (2011) states that the architect’s intention was to create a space that is defined by a strong physical presence of books, which connects to the experience that comes from reading, something that can not necessarily be given by electronic or digital books. The idea was focussed on creating that specific physical atmosphere where these artefacts and activities can manifest in order to strengthen the relationship between humans and books in a digital age.

The presence of the actual artefact translates into a nostalgic feeling and atmosphere in the space, the books become spatial elements which define more intimate space within the large volume of the building. It becomes clear that the natural light, the volume and the presence of the artefacts enhance the spatial atmosphere. However emphasis is only placed on the physical realm and does not show any integration of the digital realm.

3.4.2 JAMES B. HUNT JR. LIBRARY

North Carolina, America
2013
Snohetta

The library is designed to integrate the technologies of our digital era into how the space works and features a robotic book retrieval system amongst other technologies as explained by Frearson (2013). This system allows the storage of books to fit into a much smaller space than the traditional library shelving.

The aesthetic of the space reads as two separate entities, where there is a bias of either the conventional library space or of the new technology. Integration of virtual software was the only attempt to retain relationship a between physical experience and technology. The focus on technology seems to be overpowering and the presence of the library artefacts disappear, resulting in a generic spatial aesthetic.
3.4.3 Unnumbered Sparks

Vancouver, Canada
2014
Janet Echelman + Aaron Koblin

Unnumbered sparks is an interactive rope sculpture suspended in the sky and created through collaboration by artist Janet Echelman and Aaron Koblin for TED’s 30th anniversary. Janet Echelman (2013) states that the artist wanted to explore how people could experience the sculpture in a new way and with the help of technology created a giant visual artwork that could be choreographed by the visitors in real time. At night the sculpture was illuminated and visitors were able to ‘paint’ beams of light across it with the use of their smartphones and tablets.

This installation brings together both the power of technology and the physical experience of the user. It takes away the focus from the digital object by bringing the experience into the world that surrounds us. The digital interface is no longer the focus and the experience of the artefact is supported through the application of technology (digital realm) which allow for a captivating experience.
3.5 Guidelines

Guidelines where set up to serve as reminder to support the decision making process of the design, the intention is not to apply these as a list of requirements, but rather valuable aspects to take into consideration for the design. The guidelines are informed by theory, comparative analysis as well as precedent studies done.

Creating context: The operational purpose of the space should be clearly expressed through spatial configurations and artefacts.

Presence of the artefact: The artefacts contribute to the intangible qualities of the space and also help to formulate a better understanding of the surroundings and should be incorporated as spatial elements.

Dynamic space: The space should be dynamic in its use and character and should be able to adapt to specific requirements.

New character: The new spatial character requires the integration of both realms’ characteristics into one. It requires a careful exploration of how the one could influence and inform the other.

Seamless physical aesthetic: The integration of the two realms requires an intricate investigation of how they visually collide into a cohesive space.

Intangible experience: Intervention should be explored on an immaterial level, where the space expresses a unique atmosphere.

Balance: Placing emphasis on the design of lost qualities to restore balance in the new spatial language. Selective design to enhance the valuable qualities that have been lost through this process of dematerialization.

Interaction: The intervention should encourage physical interaction and stimulate the senses of the user. We are still material beings surrounded by materials.

Accessibility: Where physical accessibility is not possible, the intervention should create opportunity for visual access in space. The space should incorporate various levels of transparency.

Volume: Open volume should be investigated as it contributes to the intangible qualities and atmosphere of the space.

It becomes clear that the process of dematerialization is affecting our interior environments, immaterial characteristics of the digital realm influencing how we perceive space and therefore it becomes imperative to grasp the importance of materiality as it adds nuances to the experience of the place.

Refer to Chapter 4 section 4.6.2, for an additional list of characteristics which are defined to support the spatial development of there-representation of the architectural drawing archive.
3.6 CONCLUSION

The investigation done in this chapter becomes the base of all the design exploration to follow. The chapter concludes with a list of guidelines that would support the decisions to be made for the spatial intervention.

Through the comparative analysis the essence of the archive was obtained and the significant qualities that need to be re-introduced and integrated into the new cybrid archive where defined. Chapter 4: Making will be an investigation of paper as the material to support the act of making as specified in Chapter 2: Methodology, with the aim to strengthen and create a link between the digital and physical archive.