D U A L I S M S   I N   M O D E R N I T Y :

A MACHINE FOR LEARNING IN

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Faculty of Engineering, Built Environment and Information Technology.

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Declaration

In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and thesis, I declare that the thesis, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already, or is currently being submitted for any such de- gree, diploma or other qualification.

I further declare that the thesis is substantially my own works. Where reference is made to the works of other, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

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Saskia Marti Harrison

A C K N O W L E D G E M E N T S

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"Technology is rooted in the past. It dominates the present and tends into the future. It is a real historical movement— One of the great movements which shape and represent their epoch. It can be compared only with the Classic discovery of man as a person, the Roman will to power, and the religious movement of the Middle Ages.

Technology is far more than a method, it is a world in itself. As a method it is superior in almost every respect. But only where it is left to itself as in the construction of machinery, or as in the gigantic structures of engineering, there technology reveals its true nature. There it is evident that it is not only a useful means, that it is something, something in itself, something that has a meaning and a powerful form— so powerful in fact, that it is not easy to name it. Is that still technology or is it architecture? And that may be the reason why some people are convinced that architecture will be outmoded and replaced by technology. Such a conviction is not based on clear thinking. The opposite happens. Wherever technology reaches its real fulfillment, it transcends into architecture. It is true that architecture depends on facts, But its real field of activity is in the realm of the significance.

I hope you will understand that architecture has nothing to do with the inventions of forms. It is not a playground for children, young or old. Architecture is the real battleground of the spirit. Architecture wrote the history of the epochs and gave them their names. Architecture depends on its time. It is the crystallization of its inner structure, the slow unfolding of its form. That is the reason why technology and architecture are so closely related. Our real hope is that they grow together, that someday the one be the expression of the other. Only then will we have an architecture worthy of its name: Architecture as a true symbol of our time."

- Ludwig Mies van der Rohe

April 17, 1950

ID Merger Speech at the Blackstone Hotel in celebration of the addition of the Institute of Design to Illinois Institute of Technology

A B S T R A C T

This dissertation is rooted in the theory of time and place and it considers the built environment through the lens of past, present and projected future evolution. The project examines various themes of dualistic study within the broader subject of time and change. Pertinent to the 21st century, the interface between man, technology and architecture is investigated in an examination of how architecture can intervene in the process of perpetual modernisation and the benefits or compromising attributes it has on man. Additionally, the relationship between old and new built fabric in architectural heritage is studied and a mediative architectural approach is proposed. Also, the dual construct of permanence and change in architecture is investigated.

At the dawn of the fourth industrial revolution, where the physical- and the cyber worlds are continuously interwoven, a re-examination of learning models and the volatile situation of higher education in South Africa is conducted in anticipation of what technological advancement continuously presents and the impact this has on man and the built environment.

The site of the Government Printing Works embodies a comprehensive intersection between time, change and architecture with a rich development history spanning over 120 years. The block tells the story of function, production and dissemination of knowledge, and this intangible heritage is commemorated by the proposed programme of a T.E.L. (Technology-Enabled-Learning) Centre that blends physical and virtual learning environments and where knowledge is distributed in a ubiquitous manner.

O P S O M M I N G

Hierdie studie is gegrond in die teorie oor tyd en plek en dit beskou die bou-
omgewing deur die lens van verlede, hede en geprojekteerde toekomstige
evolusie. In die wyer onderwerp van tyd en plek word verskeie temas van
dualistiese studie ondersoek. Met toepassing op die 21ste eeu, word die
koppelvlak tussen die mens, tegnologie en argitektuur ondersoek, deur 'n studie
oor hoe argitektuur kan ingryp in the proses van onophoudelike modernisering
en die voordele of nadele wat dit inhou vir die mens. Daarbenewens word
die verhouding tussen ou en nuwe geboue bestudeer en 'n bemiddelinde
argitektoniese benadering word voorgestel. Verder word die dubelle benadring van
vastheid en verandering in argitektoniese elemente ondersoek.

Aan die omvang van 'n vierde industriële revolusie, waar die fisiese en die kuber
wêrelde voortdurend verweef word, word 'n herondersoek van leermodelle en
die huidige wisselvallige situasie van hoër onderwys in Suid-Afrika gedoen, in
afwagting van wat tegnologiese vooruitgang voortdurend bied vir die mens en die
beboude omgewing.

Die terrein van die Staatsdrukkery verpersoonlik 'n omvattende kruising tussen
tyd, verandering en argitektuur met 'n ryk geskiedenis van ontwikkeling wat
strek oor meer as 120 jaar. Die blok vertel die verhaal van funksie, produksie en
die verspreiding van kennis, en hierdie nie-tasbare erfenis is herdenk deur die
voorgestelde program van 'n T.A.L. (Tegnologie Aangedrewe-Leer) Sentrum wat
fisiese en virtuele leeromgewings saamsmelt en waar kennis versprei word in 'n
alomteenwoordige wyse.

P R O J E C T   S U M M A R Y

T I T L E : *Dualisms in Modernity: A Machine for Learning in*

P R O G R A M M E : T.E.L. [Technology-Enabled-Learning] Center

A D R E S S : Government Printing Works: 127Johannes Ramokhoase Street, Pretoria CBD

R E S E A R C H   F I E L D : Heritage & Cultural Landscapes

T H E O R E T I C A L   P R E M I S E : Time and Change: Man, Technology & Architecture

K E Y W O R D S : Technology, Architecture, Education, 21st Century, Digital, Virtual

C O N T E N T S

C h a p t e r   1

I N T R O D U C T I O N

PROBLEM STATEMENT / IDENTIFICATION / DIAGNOSIS / LOADING

1.1 THEORETICAL BACKGROUND: TIME AND PLACE

This dissertation is broadly rooted in the dual subject matter of **time** and **place** and the inevitable (cultural, social, political, environmental and specifically technological) **changes** that accompany the passage of **time**; also, the effects of these **changes** on the built environment and resultantly, on everyday life. The problem statement for this study partly examines how architecture, as a permanent fixture in the landscape, is inconsistent with the **changes** that The Modern Project continuously presents.

The 21st century **paradigm** is thus far predominantly associated with designations of the *digital age* or the *information revolution*; and it is a relatively young development when viewed in relation to the average **life-span** of buildings. Technology has brought about such a radical shift in **contemporary** culture over the last two **decades**, especially in the realms of information and communication.

Frank Lloyd Wright (1953) stated that "Every great architect is - necessarily - a great poet. He must be a great original interpreter of his **time**, his **day**, his **age**". By 'interpreting' this **era**, the architect has to take cognisance of and engage with the things that characterise and dominate the culture of his **time**. The broad, underlying research questions that this dissertation therefore aims to investigate are as follows:

> *How can architecture intervene in the process of perpetual modernisation and the inevitable benefits or side-effects that it presents?*

More specific to the **contemporary age**, the question is:

> *How can architecture engage with the technological phenomena of the digital age, mass media and cyberculture?*

> *How can architecture be 'a true symbol of our time' as professed by Mies van der Rohe (1950) (as cited on page iii) and in addition to this, how can architecture remain that symbol in perpetuity?*

1.2 TIME AND PLACE: HERITAGE vs PERPETUAL MODERNIZATION

The subject of **time** and **place** is also intrinsically connected to **heritage** in architecture; with every passing day another layer can be added to South Africa's architectural **heritage**. **Changes** over **time** (very often technological **advancement**) may render the functional value of a historical building obsolete. Especially during a period of radical **transformation** there is a general tendency towards nostalgia for the **past**: examples being the romantic period in reaction to the industrial revolution toward the end of the 18th century, or postmodernism in reaction to modernism in the 20th century. The term *conservation* can refer to a number of things, and it is exactly this nebulous area of definition that brings forth confusion as to *how to conserve*.

The same confusion exists when constructing a new neighbour next to (or in the immediate context of) the **historic** heritage building. Generally, we are either too afraid to touch something of the **past**, or, with legislature in place that forbids us to demolish it, in our ignorance we construct an a-contextual, **contemporary** structure beside it with an arbitrary, if any, relationship to the historic building. This being said, if we do not deal with the functional aspects of **heritage** we will just end up with scenographic 'cardboard cut-outs' of old buildings in the city (Barker, 2016). Dormant **heritage** buildings also have a stagnating effect on their surrounding environment, therefore they need to be **adapted** and integrated into **contemporary** life.

1.3 MODERNITY'S INHERENT DUALISMS

In light of these postulations the theoretical backdrop of this dissertation is concerned with three themes (related to the theory of **time and change**) of dualistic study (Fig 1.1):

- Firstly, the dichotomy of **old** and **new** in one symbiosis will be investigated in terms of both tangible and intangible relationships. This will be done by extensive analysis of the existing (separate components and as a whole) in order to arrive at a synergic strategy of intervention.

- Secondly this project will examine the duality of the beneficial nature of technological **progression**, while also contemplating the resultant compromising conditions that accompany it. Various technological **advancements** related to spatial design will be considered and critiqued in order to generate strategies for the built environment that are relevant and necessary for the **21st century** (Fig 1.2).

- The third dualism that will arise in the dissertation is an approach that considers the built environment not only in terms of the **past** and **present time-dimensions**, but also in terms of the **future**; the same logic of *change through time* and *adapting the old* is applied to the new building, for **future** reference. This suggests a new conception with varying degrees of **alterability**, so the dualism of **permanence** and **change** within architectural design is another area of investigation in this dissertation.
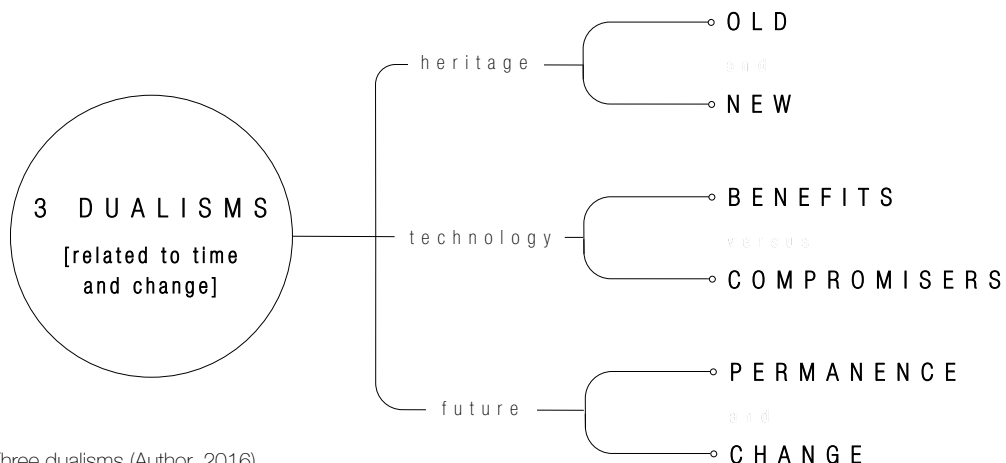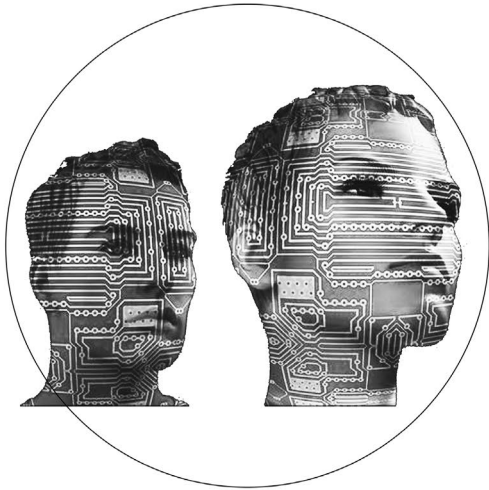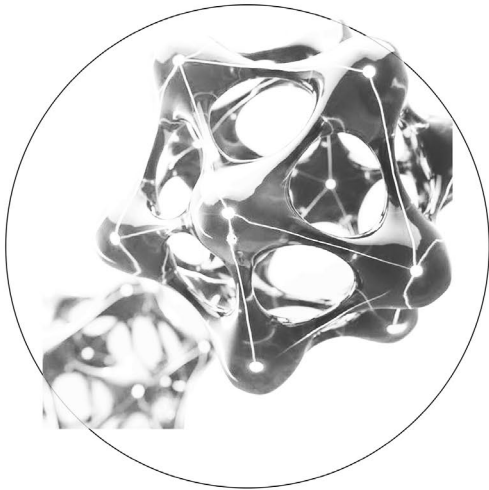


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[related to time
and change]                                   ┌────── B E N E F I T S
                            t e c h n o l o g y┤ versus
                                              └────── C O M P R O M I S E R S

                                              ┌────── P E R M A N E N C E
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                                              └────── C H A N G E
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Figure 1.1: Three dualisms (Author, 2016)

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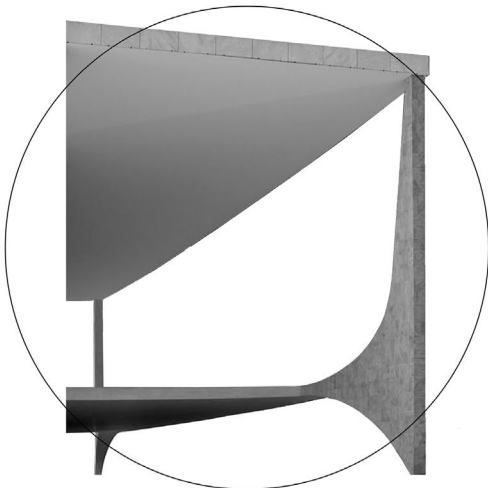
[t e c h n o l o g y]

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[designing the interface between man & technology]

Figure 1.2: Theme of dissertation:
Man, Technology and Architecture

1.4 IDENTIFICATION OF SITE:

GOVERNMENT PRINTING WORKS

Bordering the periphery of the north-western quadrant in the Pretoria CBD is the site under investigation: the block of the old Government Printing Works (GPW) on the corner of Bosman and Madiba Streets (Fig 1.3), just one block north-west of Churh Square. This block has a rich **history** of development spanning over 120 years and includes an example of architectural **heritage** that has **become dormant over time**. The block is owned by the DPW (Department of Public Works) and the Government Printing Works rents it from them; however, they (GPW) are in the process of migrating to another location - which opens up opportunities for intervention on this site. This dissertation aims to interrogate the city block as a whole, in order to unlock inherent spatial potential for a broader context.
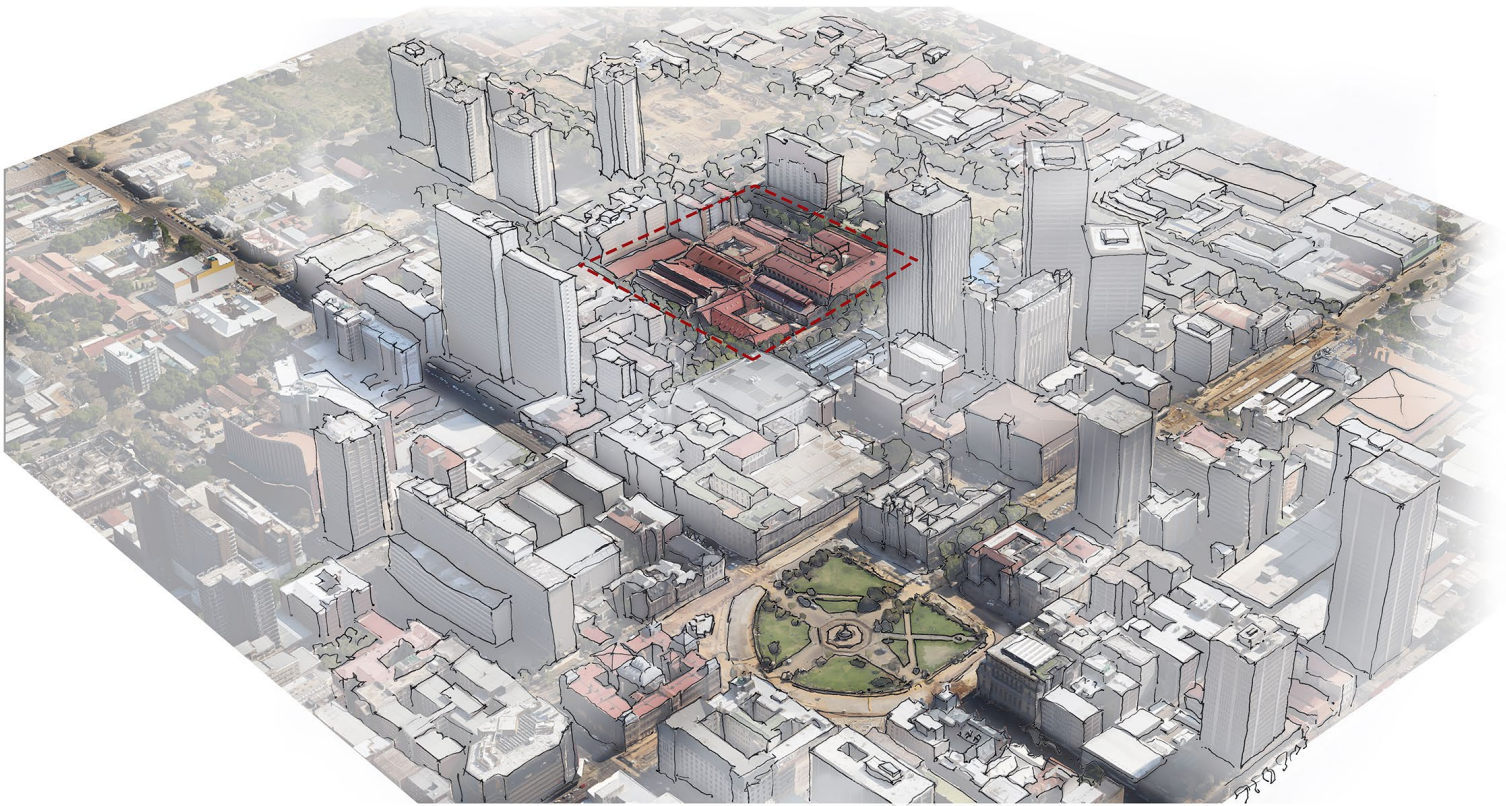
Figure 1.3: Locality map (Author, 2016)

1.5 DISCONNECTED NORTH-WESTERN QUADRANT

The most influential socio-political **change through time** that present-day architects and city-planners in South Africa are faced with is the **resultant conditions** of the previous political **paradigm**, in which cities are still marked by the scarring of segregation. The administrative capital of Pretoria is a prime example; Clarke and de Villiers (2015: 67) recognise that "due to the historic forced removals undertaken under Apartheid planning policies, the north-western quadrant of the city centre has become a place of desolation." Church Square is arguably the most important civic space in Pretoria (if not the country) and its surrounding urban fabric should reinforce it as such. Currently the north-western quadrant is in dissonance with the rest of the CBD context. For this reason the government is implementing various visionary planning schemes to revitalise this stagnant stretch of land, which is already evolving towards a more community-oriented area. The urban intention of this dissertation is therefore to establish an open and engaging urban block precinct to give an invigorating energy to the surrounding environment.

1.6 INEQUALITY, EDUCATION & TECHNOLOGY

The current unemployment rate for South Africa is 25,2% (Statssa, 2016). This dire economic situation is directly linked to the overall educational structure in the country. Nelson Mandela (2003) stated that "Education is the most powerful weapon which you can use to **change** the world". Twenty-two years into democracy, however, the educational infrastructure is still trying to eradicate the effects of the Bantu-education system and level the scales of equality.

In an interview conducted with Adam Habib (Poplak, 2016) he recognises the need for (and current lack of) alternative higher educational institutions in South Africa, beyond universities, such as **vocational schools and training facilities** "to sop up students destined to fall through the gaps". While universities need to maintain high standards, according to Habib, intermediary institutions (beyond secondary schooling) that provide technical trade skills, are necessary for people at the lower end of the educational scale to move upwards from their existing skill-level.

In addition to the existing unemployment rate, Lodder (2016) states that we stand on the brink of the *fourth industrial revolution* (explained in Chapter 2) "that will fundamentally **alter** the way we live, work, and relate to one another"; it is estimated that 47% of existing jobs are at risk for replacement by digital and robotic technologies in the next twenty years (Lynch, 2015). In an article in *The Economist* (2014), it is also suggested that this new **era** will bring forth even greater **inequality**, as most of the jobs that will be automated are in the lower- and middle-class spectrum (positions in the manufacturing and services industries (Lynch, 2015)), while the higher end will prosper even more with regard to skills and wealth.

South Africa cannot afford the gap of inequalty to grow even larger, and therefore, in order to ensure job availability in **future**, educational content should additionally be focused those professions that will not be consumed by technology.

Associate Professor in machine learning at Oxford University, Michael Osborne (as cited by David, 2015) states that "Creativity is arguably the most difficult human faculty to automate: robots are unlikely to be fully creative any time soon"; in addition to this, writer Joel Lee (2014) explaines that learning content should be focused on "jobs that require an element of human behaviour that computers cannot replicate: intuition, creativity, innovation, compassion, imagination, and so on". The creative arts industry is therefore a more sustainainable investment in terms of inevitable **future** technological **advancement** and, especially in South Africa, with the dire call for decolonised education, creative learning facilities present a fresh and continuously reshaped outcome.

Additionally it is estimated that by 2019 more than 50% of educational courses will be done through 'e-learning' (electronic learning) (Laskaris, 2015), in which educational institutions will present all the learning content (regardless of the subject matter) on a virtual basis to the student. This presents the advantage of non-place-based (distance) learning but also the disadvantage of a dependence on technological enablement to provide one with the content. However, as this document will argue, e-learning will prove to be a much more **personalised** and **effective** way of learning, and therefore it will be implemented.

Set within a community-oriented neighbourhood, a public educational facility will add value to the lives of the people in the immediate area. The intrinsic function of the Government Printing Works block is primarily about the 'production and dissemination of information' (Clarke, Kuipers and Swart, 2015: 115); and this intangible **heritage** is commemorated through a public T.E.L. (Technology-Enabled-Learning) Centre. This training centre is firstly focused on technical trade-skills in response to the current, broader economic, social and educational circumstances in South Africa, but also focussed on training for the creative arts, in preparation of the *fourth industrial revolution* (programme fully explained in Chapter 5). The programmatic intention is that the learning stretches beyond the physical 'school' boundaries into the urban realm and makes use of digital and virtual reality technologies to stimulate the learner. Furthermore the technology-enabled-programme blurs the boundary between education and recreation, and contributes to the neighbourhood as an exciting drawing point for people of all ages and backgrounds.

This document starts out with a theoretical background supposition to establish the basis of the underlying subject matter, thereafter it examines the project-specific informants.