Towards a satisfactory learning environment:

Importance-Performance Analysis

of the on-campus requirements

# of architecture students

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A dissertation submitted to the Faculty of Engineering and the Built Environment,

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Master of Architecture by Research.

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Declaration

I declare that this dissertation is my own, unaided work. It is submitted for the degree of Master of Architecture by Research at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this, or at any other university.

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Annemarie Wagener 472384

At _____

on the _____ th day of _____ 2012.

Acknowledgments

Research is a ‘lonely journey’, and those who help to smooth the path for the weary traveller deserve to be acknowledged:

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Abstract

The on-campus learning environment often falls far short of the expectations of architecture students. One reason is that these students are seldom given a voice in how their schools are designed, or how the facilities are managed. This study tested the use of Post Occupancy Evaluation (POE), and Importance-Performance Analysis (IPA) as a strategic method of addressing this shortcoming.

To do this research, a POE questionnaire was developed, based on the theoretical underpinnings of good design of places for adult learning, questionnaire design, POE, and IPA. After implementation of the questionnaire at four South African schools of architecture, the collected data were processed using standard spreadsheet software.

Once the results were presented in an IPA matrix format, it was clear that there are several commonalities in the needs and desires of architecture students from the different schools. Some requirements, such as that for well equipped computer laboratories were not surprising. Others, such as a universal need for quiet, separate spaces in which to work; and outdoor places where they can gather to work or 'chill' away from their studios and classrooms were less expected outcomes. The typically poor quality of indoor environmental conditions was exposed as one of the main reasons why architecture students now often prefer to make use of alternative, off-campus ways of working, and of communicating with each other and with their teachers.

The implication of these findings is that by combining POE and IPA, it is possible to identify and monitor the attributes that are necessary for a satisfactory on-campus learning environment. Where shortcomings are identified with POE, strategic responses can easily be devised using IPA.

The dissertation is concluded with suggestions for future applications of the proposed questionnaire and data analysis method, to enable benchmarking at schools of architecture and improve the on-campus environment of students of architecture.

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Definitions & key terms

Constructivism

Constructivism, as a theory of learning, supports the notion that learners are active participants in the process of constructing their knowledge and reality, rather than passively recording it (Atmodiwirjo & Andri Yatmo, 2004; Karagiorgi & Symeou, 2003:18; Paavola, Lipponen & Hakkarainen, 2004:572).

Formal learning spaces

The use of formal learning spaces are completely under the control of the academic institution and subject to scheduling, set hours of use, seating, and predetermined learning activity patterns such as lectures or discussions (Johnson & Lomas, 2005:16).

Importance

A reflection by consumers of the relative value of different quality attributes (O'Neill & Palmer, 2004:43).

Importance-Performance Analysis (IPA)

IPA is a model for reporting customer satisfaction, and for identifying the primary service attributes that a service provider should focus on. The outcomes of an analysis are presented on an I-P grid.

Informal learning

Adult learners learn informally by debating, discussing, observing, and asking for help (Acker & Miller, 2005:5). This type of learning "results from serendipitous interactions among individuals" (Oblinger, 2006b:1.1).

Learning

"The process whereby [personal] knowledge is created through the transformation of experience, or a relatively permanent change in knowledge, behaviour or understanding that results from experience" (Kolb & Kolb, 2005:194). Learning is the result of "synergistic transactions" (*ibid*.) between learner and environment.

Learning environment

An "intrinsically fuzzy and ill-defined" (Gruenewald, 2003:622) concept, described by Strange (2000:20) as the setting in which the learner acts, and where learners meet, interact, and share experiences. The on-campus learning environment is created by the interaction between physical, human, organisational, and social factors.

Performance

"The level of service delivered to clients against agreed standards and targets set out in the service specifications and service level agreements" (Atkin *et al*, 2000 in Kwok & Warren [2005:5]).

Post-Occupancy Evaluation (POE)

"[A] systematic study of buildings in use to provide building designers with information about the performance of their designs, and building owners and users with guidelines to achieve the best out of what they already have" (RIBA Research Steering Group, 1991, cited in Tanyer & Pembegül, 2010:241-242).

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Quality and functionality

Quality: Fitness for purpose.

Functionality: The fit of a product with the function it is designed to serve (Rasila *et al*, 2010:147).

School of architecture

A division of a university's faculty, devoted to the academic discipline of architecture. The delineation of such an entity as 'department' or 'school' or 'faculty' varies from institution to institution and therefore, in this document the term "school" or "school of architecture" is used throughout to describe such an organisation.

Space and place

In this document, learning 'space' denotes the Euclidian concept of an 'ordinary two- or three dimensional space' within which learning takes place.

'Place' denotes the multi-dimensional environment (physical, virtual, and conceptual) that supports the learning process.

Studio culture

The American Institute of Architecture Students defines it as "the experiences, behaviours, habits and patterns found within the campus-based architecture design studio" (AIAS, 2010).

1 Introduction

1.1 Background to the problem

1.2 Problem statement

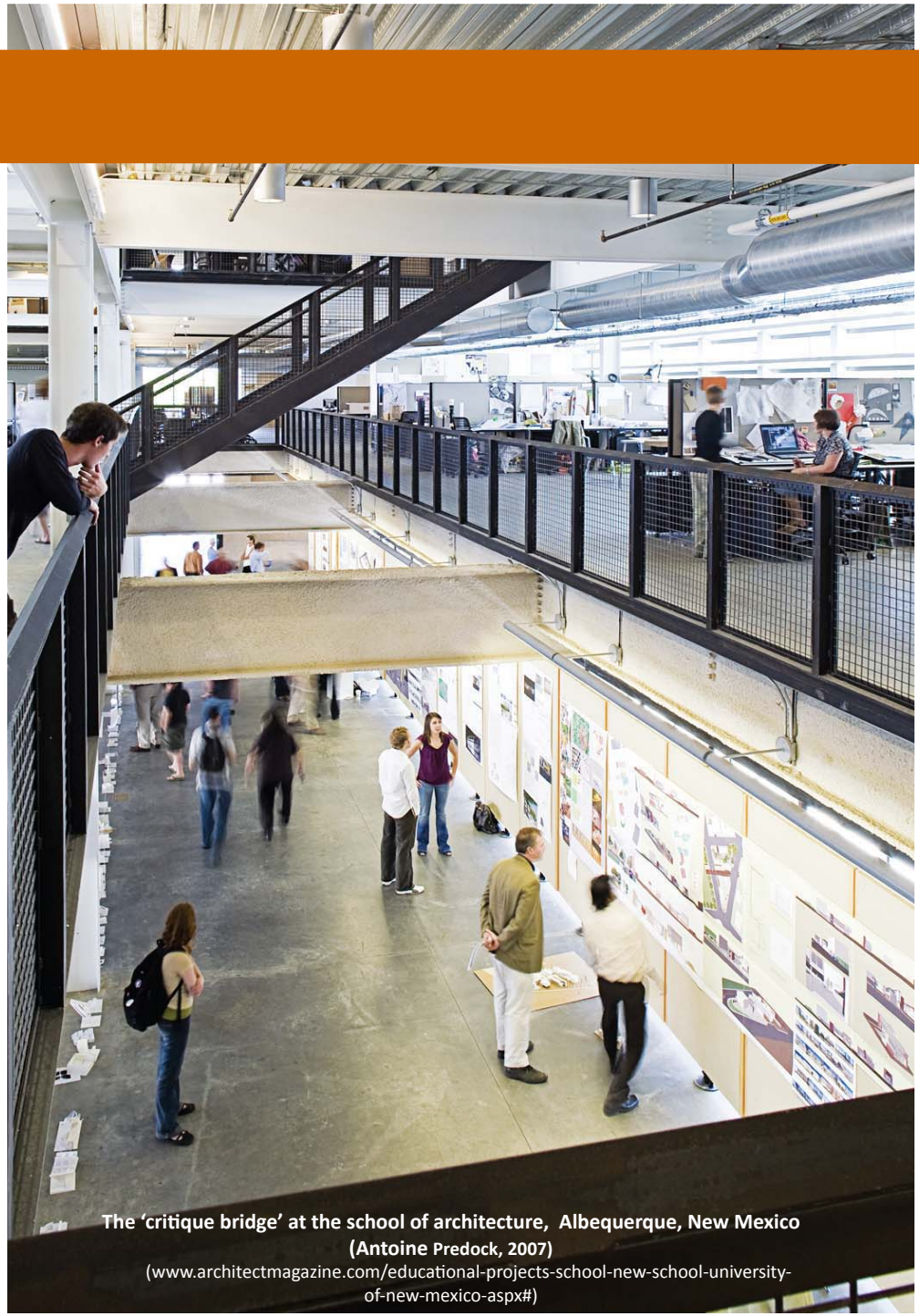
1.3 Research goal and objectives

1.4 Research methodology

1.5 Research scope and limitations

1.6 Research deliverables

1.7 Chapter overview



The 'critique bridge' at the school of architecture, Albequerque, New Mexico (Antoine Predock, 2007)
(www.architectmagazine.com/educational-projects-school-new-school-university-of-new-mexico-aspx#)

1. INTRODUCTION

This chapter presents the research problem and the context within which it occurs. The role of the academic institution as service provider of the on-campus learning environment is discussed. Importance-Performance Analysis combined with Post Occupancy Evaluation is presented as an effective method of data collection for evaluation of student satisfaction, and for interpreting, and presenting evaluation data. Its value in strategic planning is illustrated. The research methodology, limitations, and scope of the study are outlined.

1.1 BACKGROUND TO THE PROBLEM

Students expect that universities will provide the best possible on-campus learning environment for their specific needs. Facilities managers and schools of architecture want to provide students with the best possible physical learning environment. There is however, a knowledge gap between typical facilities design strategies on the one hand, and understanding of the needs and preferences of architecture students on the other. Previous studies have evaluated schools of architecture, both in terms of the quality of the curriculum of and the physical facilities in which the curriculum is implemented. None of the studies found, has attempted to find out what architecture students want of their learning environment. The 'learning environment' is considered here to be the setting in which the learner acts, and where learners meet, interact, and share experiences (Punie, 2007:191; Strange, 2000:20; Wilson, 1995:3). This broad construct includes several 'sub environments' such as academic, social, physical, and personal. This study focuses on the physical on-campus learning environment as it is experienced by students of architecture.

Institutions of higher learning understandably pay close attention to their academic standards and systems, but research indicates that these are often over-emphasised at the expense of the physical components of the learning environment (Gallifa & Batallé, 2010:158; Price *et al*, 2003:212; Salama, 2009b:37). A basic premise of this study is that the physical (or built) environment is inextricably linked to the academic, social, and personal environments and that it forms the all-encompassing stage for teaching and learning activities. There is no lack of multidisciplinary research and support for the facilitation of teaching and optimising teachers' activities (cf. Brown, 2005:3). The facilitation of learning however, is often low down on policy makers' agendas and it should not be assumed that all those involved in its provision necessarily understand the importance of space and place. When designers and campus directors do not fully understand the importance of a holistic approach to evaluating student satisfaction, this imbalance often goes unnoticed.

It may be somewhat unfair to censure academic managers for failing to understand all the complexities of such an "intrinsically fuzzy and ill-defined" (Gruenewald, 2003:622) concept. Less forgivable is that the very professionals who aspire to improve the quality of the built environment - architects - should often have to learn their craft in poorly designed and maintained buildings. Unfortunately, as Clark and Maher (2005:1) observe, many designers of learning environments see rooms as places for teaching, but are unable to envisage them as places where learning is experienced. Bentham (2008:73) – with specific reference to teaching space – observes that when training professionals, it is important to "practice what we teach". Kolb (1981:252) agrees that "we must closely scrutinise any [teaching] strategy that requires students to do what we ourselves cannot or will not do".

Architecture is however not the only profession to overlook those needs that learners may have outside the boundaries of its sphere. Publications about 'learning environments' such as *Powerful learning environments: unravelling basic components and dimensions* (De Korte *et al*, 2003) make no mention of the physical space in which that learning takes place. Books on improving learning and the student experience (e.g. Upcraft *et al*, 2005) only mention it in passing. And even though research into the influence of the physical environment by adult educators, psychologists and architects has been steadily increasing, most teaching still takes place in classrooms that are poorly suited for learning (Graetz & Goliber, 2002:13). Many teachers adopt teaching approaches such as constructivism (see 'Definitions'), but do not adapt the physical environment to suit these new methods. Fortunately, some pedagogical theorists (for example Jankowska & Atlay, 2008:276;

Zandvliet & Buker, 2007:[sp]) are now starting to consider the physical environment to be one of the most important influences on effective learning (*Fig*. 1).

Rasila, Rathe & Kirosuo (2010) have found that users experience buildings as "holistic entities" (*ibid*:143) that either hinder or help them in carrying out their tasks and activities. In other words, users do not separate the factors that influence how they experience their environment into categories such as social, technical, or virtual. If satisfaction lacks in one of these environments, it can negatively influence users' overall perception of quality (*ibid*). Therefore, even though an institution may deliver excellent social and technical services, a poorly designed physical environment will negatively influence overall student satisfaction. Universities should therefore, as Price *et al* (2003:213) believe, treat physical facilities as having a distinct influence on the quality of the complete student experience and subject them to appropriate analysis. There are several instruments available for measuring student satisfaction variables: from the general such as SERVQUAL, the Noel-Levitz Student Satisfaction Inventory, and the Student Satisfaction Approach (SSA), to the building-specific such as Post Occupancy Evaluation (these are discussed in more detail in Chapter 2).

An initiative at the School of Architecture at the University of the Free State in South Africa, the 'Centre for People and Building (South Africa)' (CfPB-SA) set out to "initiate and undertake research pertaining to person-environment issues" and also to "sensitise students of architecture to the potential benefits thereof to the architectural and Facility Management (FM) professions" (le Roux, 2009:68). Unfortunately this initiative did not bear long term fruition. Apart from this unsuccessful project, no evaluation programs have been implemented (or published) at South African schools of architecture.

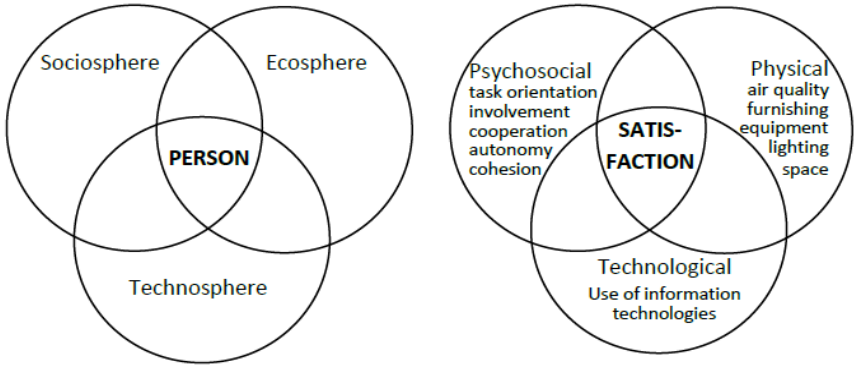


Figure 1: The person as the core of the learning environment; and Figure 1b: Satisfaction at the core of environmental factors (After Zandvliet & Buker, 2007:[sp]).

1.2 PROBLEM STATEMENT

University campuses in general and the premises of schools of architecture in particular are often poorly designed, or even downright unpleasant, places for learning. The student survey at four architecture schools in South Africa (*Fig*. 2 – *Fig*. 5) largely supports this observation. It is not surprising then, that to the chagrin of their studio masters, architecture students are avoiding the use of unsatisfactory on-campus resources. Students attend formal teaching activities when those are on the timetable and "vote with their feet" (Duggan, 2004:71) at other times.

Figure 2: Tightly packed first year studio, UA (Author, 29.11.2011)

Figure 3: First year studio, UB (A Janse van Rensburg, 12.02.2012)

Figure 4: Fourth year studio, UC (P. Tumubweinee, 22.08.2012)

Figure 5: Over crowded mixed studio, UD (Author, 19.11.2011)

Numerous studies (e.g. Blythe & Gilby, 2006; Duggan, 2004; Kasim & Dzakiria, 2011; Riley, Kokkarinen & Pitt, 2010) show a link between the learning environment and academic success. This is arguably even more so for professional courses with their "entailed narcissistic identities" (Moore, 2000:198), that require learners to become socialised to the particular norms of their field, and develop a professional identity (Kolb, 1981:233; Pearson, 2003:102). Kolb (1981:233) also found that specific disciplines have particular learning tasks, technologies, products, criteria for academic excellence and productivity, teaching methods, research methods, and methods for recording and portraying knowledge. Kolb's (*ibid*.) findings are supported by Tucker (2007) who studied the particular learning styles of students in the built environment disciplines. Tucker's (*ibid*.) research indicates that over time, learning styles adapt to the requirements of the chosen discipline. This indicates that as students become more acculturated to the particularities of their field they will have more specific, discipline-related requirements of their learning environment.

From the above, it can be extrapolated that students in professional disciplines such as architecture have particular requirements of their learning environment. Despite the well known link between learning place and academic success, and the special requirements of students, schools of architecture do not appear to consistently provide suitable learning environments. One reason could be that, as Fulton (1992:2) comments, that much of adult education happens in places that have been designed for other activities, or even in spaces more suited to teaching children. In HE institutions, learning is very often expected to take place in spaces generically designed for "education", not for discipline-specific education.
The ideal learning place is clearly a finely balanced combination of physical and psychological attributes that requires the full support of the institutional organisation. Weaver (2006:118) makes the point that implementing the activities, infrastructure, and cross-disciplinary collaboration needed to support new learning theories requires "a massive cultural change for any organisation". Existing organisational or disciplinary tradition should be respected but ot revered (i.e. it should not be considered sacred or unchangeable) to the point of preventing adaptation to new circumstances (du Toit, 2003:28). Duggan (2004:75) calls for "less talk about the '*way it was*', or '*the way it is*', and more about '*the way we think it could be*'" (emphasis in original).

Many studies have also examined occupant satisfaction with educational buildings and even individual schools of architecture (e.g. Nasar *et al*, 2007; Vital Signs Project, 1998; Zimring, 1983), and yet school facilities and designs still do not satisfy their users. The result is that architecture students who often spend very long hours in their university design studios, are expected to do so under much less than ideal conditions. Consider for example, evaluations of the Aronoff Centre for Design, Architecture and Planning (DAAP) (architect Peter Eisenman, 1996). These studies were done both by its own occupants (The Vital Signs project, 1998) and by independent evaluators (Nasar, Preiser & Fisher, 2007), and the results have generally not been positive.

The Vital Signs project (*ibid*.) reports that when users were asked 'As a student has the building influenced your work or creative process?' results were Yes: 65%, No: 35%. This seems a positive response, until the reason is given: "It gives me examples of what not to do if I want to design something for people." When asked to describe in one word the way the building makes them feel, users respond with: trapped, disappointing, inconsiderate, temporary, experimental, lost, conflict, intriguing, ripped off, engaging, crazy, creative, sick, inspiring, demanding, confusing.

The structure of architectural studies demand enormous dedication and sacrifice from students. While schools of architecture cannot influence the over-arching learning environment of their students, they should endeavour to provide the best possible on-campus learning environment. Many schools of architecture provide spaces that are well ventilated, well lit, and equipped with comfortable and suitable furniture and infrastructure. Many, unfortunately, do not. Law (2010:250) makes the salient observation that while institutions often conduct performance surveys, these are usually with the view of meeting demands by external bodies such as accreditation boards; seldom are they driven by academic considerations or student needs. It is only at the "lower" organisational levels of schools and even class groups where the quality indicators change to softer, more student--centred attributes (*ibid*:251). Unless they ask the opinion of students about the quality and important attributes of a learning environment, and then strategically respond to the results, schools cannot provide the learning environment that their students deserve.

1.3 RESEARCH GOAL AND OBJECTIVES

Calls for the knowledge generated through this research project are found in many texts (e.g. Forsyth, 2008; Lützkendorf *et al*, 2005; Narum, 2004; Nasar *et al*, 2007). Langdon (in Nasar *et al*, 2007:xvi) asks "[w]hat should architectural school buildings be? How do we evaluate such buildings?", and Forsyth (2008:20) asks "What kinds of information are useful in improving program quality?". This study is an attempt to answer those questions, even if only in part, by teasing out the needs of students.

It is proposed that to answer Langdon's (*ibid.*) first question – what should the building be? – researchers must ask architecture students what they consider important in their school environment. To answer his second question – how do we evaluate such buildings? – researchers need a specialised data-collection instrument that can measure the quality of the learning environment. Zimring *et al* (2010:[sp]) believe that "in the cases where [Building Performance Evaluation (BPE)] researchers want to reflect a desire to make tight, unequivocal, scientific arguments, and have as much control as possible in a real life situation, they [have to] use field experiments, rather than ... laboratory ones". Unfortunately, they (*ibid.*) point out, performance evaluation methods often lack significant experimental controls during the data-collection stages even if field data can be tested for compliance in a laboratory for more technically focussed BPE/POEs.

Nasar *et al* (2007:7) found that economic and environmental constraints cause some of the problems encountered in schools of architecture, but also that many are the result of indifference, lack of concern, or lack of knowledge on the part of decision makers and even architects. Many designers do not realise that the intentions of designers and the needs of learners are often not compatible, or as Salama (2008:109) puts it, that "the common sense of the architect is not the common sense of the user". Such design mistakes, claim Nasar *et al* (2007:33), is in part because of a lack of systematic documentation of user responses to buildings. To stay the proliferation of unsuitable and even unusable educational buildings, (Biemiller, 2008; Fisher, 2008; Greenberg, 2007; Lau & Yang, 2009; Miller, 2004; Salama, 2009a), designers should familiarise themselves with the needs and views of the current cohort of learners (Miller, 2004:2; Oblinger, 2005:15). Periodic self-assessment to understand the particular needs of their student body (Angell, Heffernan & Megicks, 2008:237) can therefore be an effective strategy to prevent a sense of hubris. Narum (2004:62) believes that campus leaders too can better plan for student needs if they know who the students are, what direction their learning is taking, how they learn, and where that learning takes place. By implementing "a more comprehensive standardised and universal methodology" (Lützkendorf *et al*, 2005:61) of building performance evaluation and user satisfaction analysis, this goal can be achieved. It is a goal of this study to facilitate such processes.

It can be argued that making strategic decisions based purely on 'subjective' or relatively short term student needs and priorities can lead to overreaction and the misapplication of resources; and that benchmarking should be included in the evaluation process. National satisfaction-priorities benchmark surveys such as the Noel-Levitz Student Satisfaction Inventory in the US and the Student Satisfaction Approach (SSA) in the UK, offer institutions the opportunity to reliably benchmark their own performance against that of others. Noel-Levitz (2011:1) point out that such external surveys are most beneficial when they are combined with regular, systematic institutional self-assessment. By developing both global and internal benchmarks, schools of architecture can focus their resources and initiatives more precisely to improve learning outcomes and student life. Longitudinal benchmarking is also a valuable indicator of the success of survey-based management decisions (Kane *et al*, 2008:138). The evaluation instrument developed and tested in this study can be used as such a benchmarking tool.

Rasila *et al* (2010:151), after an intense study of usability assessment in the built environment (including educational buildings), comment that "[a]n interesting next step would be to construct a questionnaire and to test [its] categories quantitatively in order to gain a more generalisable understanding of the phenomena in question". The data gathered through this study can be implemented with good effect for as Narum (2004:63) points out; we cannot hope to improve the learning environment if most plans for solving problems are based on anecdotal evidence about what makes the best learning environment.

It is obvious that every school will have unique attributes[1] to be assessed in addition to those that are common to the majority. A research instrument to be used unchanged at many different schools can either only address generic attributes or become so unwieldy as to be impossible to administer. The more pragmatic aim is therefore to identify those attributes that are most important, and / or least satisfactorily addressed at the majority of schools for inclusion in one, commonly used core. Individual schools can add additional attributes that they specifically want to evaluate.

Importance-Performance Analysis (IPA) is proposed as the most suitable tool to interpret and report the outcomes of on-site evaluations. IPA is explained in more detail in 1.4: Research methodology.

There are admittedly many influences on student success, but isolating one aspect – the physical environment – does not imply that others (e.g. quality of teaching, the curriculum) are somehow less important or even unimportant. It is not possible to assess all these complex attributes in one questionnaire and attempting to do so would be unlikely to deliver useful results. Knight (2002:11) for example points out that research on the influences on academic performance delivers mixed results, and the overall influence of the school environment on individual students is probably no more than 10%. This conundrum is directly addressed in the Vital Signs Project (1998). The students conducting a building evaluation of the Aronoff Center at the University of Cincinnati recognised that "architecture is often greater than the sum of its separate parts" and that context influences the outcomes of any evaluation. (For a detailed discussion of the Vital Signs Project, refer to 2.6.1 Case study 2.)

The variations in the influences on service provision and user satisfaction are so great, that it is practically impossible to know exactly what makes the "best" schools so, and how individual schools can be changed to resemble these paragons. This is however not seen as a reason why the current study cannot isolate one part of the whole and place it under a magnifying glass to introduce a little bit more insight into a vast and complex field of study. This study does not aim to solve the above problems on a global scale, or produce the "universal methodology" (and it is argued that such a thing is not possible) called for by Lützkendorf *et al* (*ibid*.). It does aim to make the architectural academic community aware of the issues that influence the satisfaction and thus the performance of its students.

1 There are several alternative terms that apply to this construct - some researchers prefer 'variables', others refer to 'assessment criteria'. In this document, the term 'attributes' is generally used and incorporate those terms.

1.4 RESEARCH METHODOLOGY

This study aims to test whether combining Post Occupancy Evaluation (POE) and Importance-Performance Analysis (IPA) is a suitable method for devising strategic decision-making interventions by architecture schools. POE is a tool used to evaluate the quality of a given built environment from the point of view of its users. Importance-Performance Analysis is easily integrated with POE, by also gathering data on the importance of variables. The outcomes of the evaluation process is then presented in an I-P matrix (*Fig*. 7). Many methods of Building Performance Evaluation (BPE), including Post Occupancy Evaluation, have been implemented at schools of architecture (these are discussed in detail in Chapters 2 and 3). Importance-Performance Analysis has been used as a method of reporting research outcomes in many fields, including that of BPE. No precedent was however found for combining these methodologies to assess the physical environments of schools of architecture.

As these methodologies appear to be complimentary, this study set out to test a combined POE and IPA evaluation method, in the field. The standard approach to POE was adapted to obtain the opinions of architecture students on 1) which attributes of the on-campus learning environment are important to them (Importance), and 2) their satisfaction with how well the institution provides those requirements (Performance).

For the sake of simplifying data gathering and analysis, satisfaction- and importance ratings were gathered using one questionnaire. Respondents were asked to rate an attribute both in terms of satisfaction with service provision, and the importance they attach to that attribute. The questionnaire was administered to third or fourth year students at four South African schools of architecture (labelled UA, UB, UC, and UD). Students in their third or fourth year of study were selected as participants because they are familiar with their

physical school premises as well as the functional and spatial attributes that architecture students require to perform successfully. Students in the first or second years of study are less familiar with the learning environment and may not respond with the same richness of information, particularly in open-ended qualitative questions. Students in masters programs are less readily accessible in groups for the administering of surveys, and may not provide large enough samples to ensure valid data.

The questionnaires for each institution are attached as Annexures B2 - B4. Based on an analysis of feedback, revisions were made to the questionnaire between implementations in an effort to fine-tune the instrument - the research process was therefore interactive and incremental (see Fig. 6).

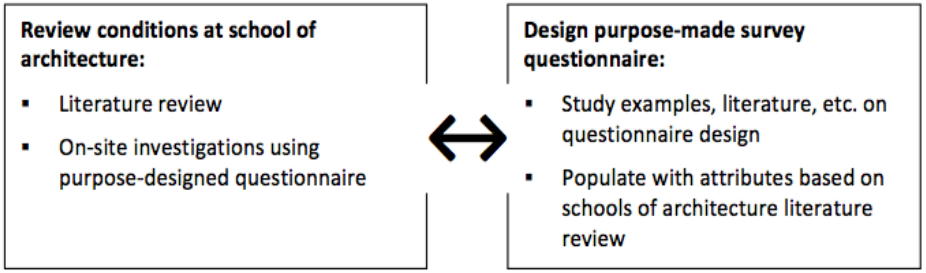


Figure 6: Interactive nature of the research process

The questionnaire data were captured and analysed using Microsoft Excel 2010, with the add-on feature 'Data Analysis Tools' enabled. The PASW / SPSS 18 software program was also assessed for its suitability but as Excel proved to be suitable for the analysis, the much more powerful but also much more complex PASW / SPSS program was not implemented in the final analysis process. The outcomes of the analysis are presented in various formats, the most significant of which is the I-P matrix (*Fig.* 7).

IPA was first proposed as a method of assessing user feedback by Martilla and James, in 1977. According to them, IPA is a simple, intuitive, and effective method used to interpret and demonstrate customer satisfaction and priorities. This information is then used to develop a response strategy (Bacon, 2003:55; Huan & Beaman, 2005). Data pairs are plotted on a four-quadrant I-P grid (*Fig.* 7). Should an attribute be rated as well provided for but not very important, then the institution need not spend additional resources on this. Should it however show to be an important attribute that is poorly provided for, the institution can achieve strategic results by responding to this shortcoming.

IPA methods have been empirically researched (e.g. Arbore & Busacca, 2011; Bacon, 2003; Iacovidoua, Gibbs & Zopiatis, 2009; O'Neill & Palmer, 2004; Preiser, 2002; Preiser & Nasar, 2008) and applied in a wide range of contexts, including assessing the quality of service delivery at institutions of higher learning (Kasim & Dzakiria, 2001; Silva & Fernandes, 2010).

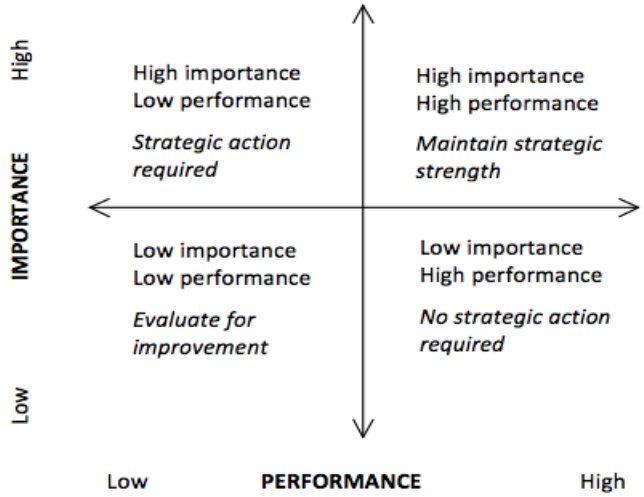


Figure 7: Principles of the IP matrix (after Martilla & James, 1977)

1.5 RESEARCH SCOPE AND LIMITATIONS

To achieve the intended outcomes of this study, it was necessary to aggregate and compare data about the on-campus needs of architecture students from different schools. The study did not attempt to compare or rank schools based on student responses. All comparisons were done to analyse patterns, similarities and differences between institutional results, and not to compare the facilities provided by the four schools of architecture.

Primary stakeholders

Each stakeholder group in the university community has its own unique set of demands and priorities. It was important to clarify exactly which group this particular project aims to serve, as this drove critical decisions about the research process and methodology. In the complex process of designing, providing, and managing learning environments, decisions are made by architects, educationalists, and HE institutions. These entities are often assumed to know what is "best" practice in their fields of influence and responsibility. However, as Gallifa and Batallé (2010:157) rightly remark, "discovering student perceptions of quality may be a quest". This study focused specifically on the opinions of students of architecture, and not those of their teachers, and/or other stakeholders in the academic environment.

Some POE studies, for example that by Tanyer and Pembegül (2010) and the Commission for Architecture and the Built Environment (CABE) study (2005) include multiple user groups of their target facility. After a fire destroyed the building of the Delft school of architecture in 2008 however, Gorgievsky *et al* (2010) conducted a Post Occupancy Evaluation only of the spatial facilities of the school staff, and not of the student spaces. Kasim and Dzakiria (2011) have however identified a critical knowledge gap, which is that "[o]nly a few studies actually [try] to understand the minds of young adults in [the] context of Institutes of Higher Learning in relation to the quality of university services." This study addresses that omission.

The setting

It is generally accepted, that the critical elements of a learning environment are learners, and the settings in which they meet and interact, and share experiences. These two aspects: the physical and the social (Weaver, 2006:112) therefore exist in a dynamic, dialectical link (*Fig*. 8). An important aspect of the study of social learning is that with the advent of social networking systems, interaction is becoming less anchored to physical space (Gieryn, 2000:463). Wahlstedt *et al* (2008:1029) however believe that because learning is a social and not an individual process, successful online learning places must have the characteristics of popular (physical) social spaces. O'Connor and Bennett (2005:28) compare online learning to raising a child online and believe that only a complete immersion in the learning environment can prevent learning from becoming dull, fragmented, one-at-a-time lessons. Formal and informal learning spaces are generally to be found on or relatively close to the campus, but virtual learning takes place away from the campus.

Thus, while the role of virtual learning is increasing and likely to play a very large part in architectural education in future. At this time however, architectural education is still largely studio-based. As O'Connor and Bennett (2005:29) observe, "the actual physicality of campus life still has no satisfactory substitutes". Research on virtual teaching and learning in the field will no doubt become the topic of interesting research in the near future. As this project focuses on the physical campus--based learning environment, the virtual domain was not included in the ambit of this project.

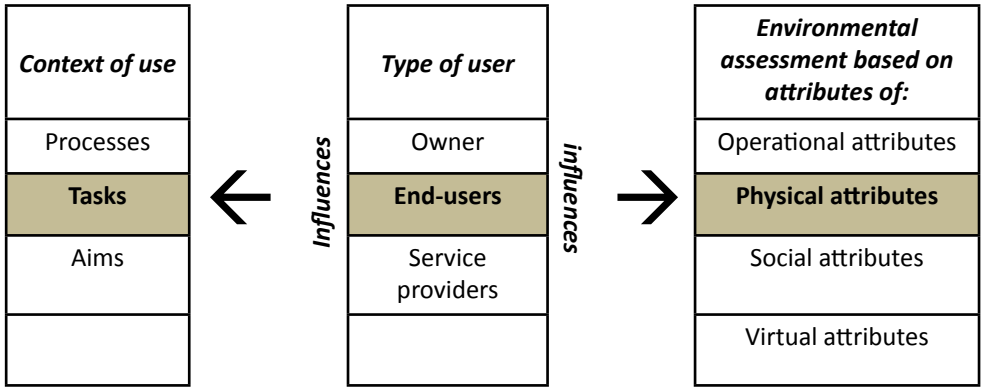


Figure 8: The relationship between context, user, and attributes to be assessed.

1.6 RESEARCH DELIVERABLES

This study had two main objectives: first, to build on and contribute to multi- and interdisciplinary studies into POE. POE has been extensively studied and thoroughly tested in the field in the context of *inter alia* architecture (Nasar *et al*, 2007; Salama, 2009a; Tanyer & Pembegül, 2010), market analysis (Arbore & Busacca, 2011; Preiser, 2002; Preiser & Nasar, 2008), geography (Kraftl & Adey, 2008), education (Spooner, 2008) and environmental psychology (Bechtel, 1996). The second goal was to expand the traditional scope of application of IPA in the HE environment from reporting on student satisfaction with the 'soft' service environment (O'Neill & Palmer, 2004; Silva & Fernandes, 2010) to also reporting on the physical learning environment.

The built environment has been proven to either hinder, or help teacher and learner interaction (Graetz & Goliber, 2002:15; Roberts *et al*, 2008:49) and therefore facilities management at HE institutions is becoming part of the overall learning delivery system (Weaver, 2006:110). A somewhat gloomy picture emerges when the quality of the physical learning environment of some schools of architecture are evaluated. This study, through the experimental implementation of the data collection instrument, tested which attributes the students at four South African schools of architecture prefer and require of their on-campus learning environment. Their satisfaction with the service delivered by the institution ('Performance') was also compared to the relative 'Importance' of the attributes. From this research, a generic template was developed (Annexure H). Widespread application of such a template can result in a central database of student needs and the quality of facilities in South African schools of architecture. As IPA has been proven successful as a tool in strategic facilities management, this can potentially result in both general and specific improvements in the service delivered by those schools.

Survey-based methods can be used to conduct various types of studies, as outlined by Reardon (2006:7-8): a cross sectional study, sometimes described as a 'snapshot', is used to gather data about a particular sample group at a particular point in time. A series of such cross sectional studies can form a 'longitudinal study' on the changing trends and opinions of a specific group (for example third year students) over time. Longitudinal studies are also used for following the progress of a student cohort (for example the first year group of 2011). "Service quality" according to Yeo (2008:281) "is a continuous pursuit where expectations and perceptions are likely to change with context and time". Longitudinal studies can help schools to keep their finger on the pulse of these changes. Such studies can focus on one cohort within one institution as they progress through a particular programme, or the study can be expanded to other institutions for purposes of comparison.

Price *et al* (2003:214), admittedly in an ageing study, found the results of studies to be "patchy" and in particular, that no published studies draw institution-specific comparisons. To remedy this situation, the research instrument developed in this study can be used to gather wide--ranging and rich data in a consistent and therefore comparable format (see for example, the template developed by Nasar *et al*, 2007).

A secondary result of the implementation of Importance-Performance Analysis at schools of architecture may be that such schools become sensitised to the importance of self-assessment and include it as part of the curriculum. Salama (2009a:83) has for example found evidence that much of the literature published on POE is being written by staff and students. Figure 9 shows a web-published student evaluation of use patterns of the elevator in the Florida A&M University School of Architecture (FAMU SoA) building (the original web page is no longer accessible). Another example is the Vital Signs Project (1998) at the Aronoff Center at the University of Cincinnati.

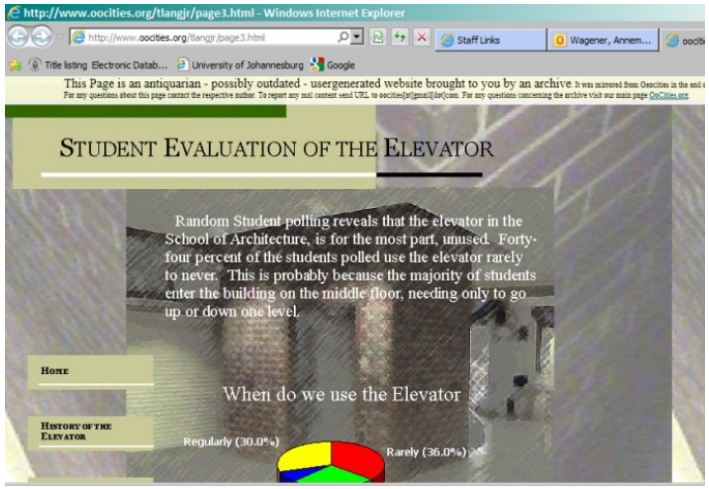


Figure 9: Student POE of lift use in the School of Architecture, Florida A&M University (www.oocities.org/tlangjr/)

1.7 CHAPTER OVERVIEW

Chapter 1 presented the research problem and the context within which it occurs. The role of the university and schools of architecture as responsive service providers was discussed. The research goal was outlined, and Post Occupancy Evaluation (POE) was proposed as an effective method of data collection. Importance-Performance Analysis was then presented as the selected method for the interpretation and presentation of POE results, and its value in strategic planning illustrated. The research method, limitations, and scope of the study were outlined. The role of the on-campus learning environment in academic success and student satisfaction was reviewed, and the importance of identifying and measuring quality criteria was reinforced. Finally, the proposed instrument to assist schools of architecture to optimise the performance of its environment was outlined.

Chapter 2: Literature Review, comprises an overview of the literature on spaces and places in which learning takes place, followed by a review of the preferred attributes of an on-campus learning environment for students of architecture. The impact of physical design on the quality of places of learning is reinforced; debates in the field are addressed; and the principles of Post Occupancy Evaluation and Importance-Performance Analysis are illustrated with the use of precedent studies. Finally, criticism of IPA and alternative models are reviewed before it is concluded that despite some shortcomings, POE and IPA are suitable instruments for achieving the goals of this study.

Chapter 3: Methodology, outlines the process of designing a questionnaire. The reasons for selecting focus group discussions and a literature review as the primary methods for development of the questionnaire are explained, and methods of collecting the appropriate quality attributes for use in the questionnaire are reviewed. The complexities of designing a good questionnaire are explained and strategies to avoid design mistakes that can result in poor data, discussed. The Association of University Directors of Estates (AUDE) questionnaire (Blythe & Gilbey, 2006), and the 'Lessons Learned' questionnaire (Nasar *et al*, 2007) are analysed and assessed for use as a template. Finally, the process of designing the data collection instrument is outlined, including the implementation of a pilot study.

Chapter 4: Results, Reports, and Discussions, discusses the implementation of the questionnaire/s at the four schools of architecture selected for evaluation. First, an overview of the data is presented, followed by an in-depth analysis of each case study. Conclusions are drawn about patterns in the data, the linear relationship between importance-- and performance ratings (or rather, the lack thereof), and the quality of the on--campus learning environments at South African schools of architecture.

Chapter 5: Summary and conclusions, reviews what the study did, and did not set out to prove. It explains that the study intended to prove that using Post Occupancy Evaluation and Importance Analysis can be successfully used to systematically collect, process and report data with the aim of generating useful knowledge. It reinforces that the study did not aim to solve problems at schools of architecture on a global scale, or produce a universal methodology of assessment. The chapter also outlines some shortcomings and potential benefits of the study outcomes. Finally, it is concluded that despite shortcomings, the study has proven what it set out to prove, and has therefore succeeded in its goal.

Annexures A and F present the pilot study and questionnaire development process; Annexures B are the questionnaires implemented during the data gathering and field work process; C- E are examples of BPE studies in use in contexts similar to those of this study; G1 and G2 contain the raw quantitative and qualitative data gathered in the field; and Annexure H is the final proposed questionnaire for future IPA studies at South African schools of architecture.