

Architects and Management: Reflections on the Education of Architectural Design Managers

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ABSTRACT

Architectural management has evolved from a small number of seminal works published in the 1960s into an important knowledge domain. The domain is underpinned by a growing body of theoretical knowledge which is valued by practitioners for its contribution to the improvement of planning, design and execution of projects. There are, however, very few educational programmes that take architectural management as their main focus. The aim of this article is to review the development of architectural management by focusing on the output of the Architectural Design Management Systems (ADMS) technological designers programme at the University of Technology Eindhoven (TU/e) in the Netherlands. This unique professional doctorate programme allows trainees to develop their skills via a combination of university and practice based work. Over 75 in-company assignments produced by the trainees over the past decade were reviewed to identify pertinent issues for practitioners and educators and to identify future trends in architectural management.

KEYWORDS: Applied research, Architectural management, Education, Knowledge domain, Practice

1 Introduction

The daily challenge of producing good architecture centres around the three core areas of design, technology and management. However, the management component is too often perceived as lying outside the architectural culture (Cuff, 1991; Emmitt, 1999) and although often viewed as perfunctory to design, the way in which architects manage their business and their project portfolio is crucial in creating and maintaining the right environment in which to create and deliver architecture. Management is a complex area and to become a good manager an individual must develop a wide range of skills and attributes, most of which are not taught in design schools (Kaderlan, 1991).

It was Herbert Simon that first placed emphasis on human behaviour in management (Simon, 1955), which was soon to feature in some of the early publications dealing with management by architects. Of these, one publication has become regarded as the antecedent of the architectural management domain; *Management Applied to Architectural Practice* (Brunton, et al, 1964). Here the authors explore the synergy between the management of the architect's business and the management of individual projects, providing an early definition and explanation of architectural management. Brunton et al's book was followed by a number of initiatives to better educate architects as to the benefits of management, although as noted by Emmitt (1999) a review of the literature reveals that much of this work has largely been ignored in the architect's curriculum; a point discussed below.

What has changed since the 1960s is a gradual increase in the number of publications that have addressed how architects manage their business and/or how they manage their projects. Architectural Management has evolved from a small number of seminal works into an important knowledge domain (see Nicholson, 1992; Emmitt, 1999; Emmitt, 2007; Achten, et al, 2007; Emmitt, et al, 2009). From a review of the literature it is evident that architectural management has expanded and changed in response to the demands of clients and users, the continuous growth in complexity of our built environment, and the focus on whole life cycle/sustainability issues. Concomitant with this is the need for better collaboration, communication and integration, facilitated by developments in ICT and a better application of management.

The aim of this article is to review the development of architectural management by focusing on the output of the Architectural Design Management Systems (ADMS) technological designers programme at the Eindhoven University of Technology (TU/e) in the Netherlands. From this it is possible to identify some pertinent issues for educators and practitioners and future trends for the development of architectural management.

2 Management in architectural education

Given the importance of design and, in the majority of countries, the importance of the architect, one might be forgiven for assuming that management would form an important part of the architect's curriculum;

but this is not the case. Writing on the subject of architectural management over fifty years ago, Taylor (1956) noted that architectural students often asked why they had not been taught the business side of architecture. Taylor concluded that there was no easy answer to this question, other than to note that management was not part of the curriculum and that the teachers were there to teach architecture; not management. Since the publication of Taylor's book there have been many changes in technologies and the way in which buildings are procured, but still there is little room for management within the architect's education. Instead management is left to be learned in practice and is addressed as part of the final right of passage, via the professional practice examination (e.g. RIBA Part 3 in the UK) and the update of the Dutch 'Architect Title Act' (WAT, 2009) in which a two year period of professional experiences is demanded for young architects before they can be registered as a Dutch architect. One exception is a new undergraduate programme developed at Northumbria University in the northeast of England. The trials and tribulations of introducing management into an undergraduate architecture degree programme is reflected upon by two of the individuals involved (Dawes and Beacock, 2009). What is evident is the ease with which managements integrates with the design projects, even from the first year, which begs the question why other undergraduate architectural programmes do not follow a similar pattern.

Outside architectural education other programmes have been successful in marrying architecture, technology and management, such as the undergraduate degree in Architectural Engineering and Design Management at Loughborough University. Graduates from this programme enter industry as design managers, working alongside architects and engineers to help realise complex architectural designs.

Lack of attention to management in the curriculum means that, for many architects, management skills have to be learned in the workplace, supported with continuing professional development activities. There are few places to study architectural management, unless undertaking an MBA. One notable exception is the Architectural Design Management Systems (ADMS) technological designers programme offered at Eindhoven University. This programme on the professional doctorate of engineering level (PDEng) has been running since 1996 and has evolved into a project based education programme with an element of applied research via case-studies and in-company assignments. Given that this programme is unique, an overview of the programme and the output of the students serves as a useful vehicle to explore the application of management to architecture.

2.1 Architectural Design Management Systems

In 1996 a new two year technological designers programme, Architectural Design Management Systems (ADMS) was started at Eindhoven University of Technology in The Netherlands as one of the eleven programmes of the 3TU.School of Technological Design SAI (Stan Ackermans Institute). Stan Ackermans was the founder of these programmes. In 2001 the programme was redesigned to make it a project oriented programme with trainees undertaking several case-studies and in-company assignments

while employed in architectural practices located in The Netherlands and other countries, such as, Austria, Belgium, China and Germany. Successful trainees gain the certificate of PDEng (Professional Doctorate in Engineering).

Trainees first spend 15 months on a project-based education centred on two real life case-studies. During this period the trainees analyze the design processes of complex projects, such as the Mosa Forum project of the well known Dutch architect Jo Coenen (Beckers, et al., 2008). Theory is mostly learned through interactive workshops and discussion sessions with lecturers from the Faculty of Architecture, Building and Planning and also the Faculty of Industrial Engineering and Innovation Sciences of TU/e. This is supplemented with guest lecturers from other universities and from architectural practice. Typical lecture topics/themes include: architectural design management, strategy and change in design organisations; management of the design office; management of the design process; decision making processes for urban development; design theories and methods specific to integral design; financing and ground exploitation; contract negotiations; building information systems; and building and construction law. At the end of the 15 months the trainees reflect with their lecturers on their own study/learning process via a session titled 'Reflections on Architectural Design Management'.

For the second case-study trainees need to make a choice for the direction in which they develop their skills. This might be focussing on the early design and development process, consultancy, design office management or design and engineering elements of design process.

For the In-Company Assignment (ICA) a trainee has to find a suitable client that fits their direction of professional development, stimulated by the management of ADMS. If the client agrees to execute an ICA, a research team is configured. The outcome is judged on its scientific merit for solving a major design process problem for a company.

From a Dutch perspective, architectural design management can be regarded as a specific knowledge domain in which the ADMS programme at Eindhoven University has gained knowledge and experience during the past 12 years. Since inception of the programme more than 75 in-company assignments (ICA) have been completed. The majority of these were written in Dutch with an English summary, although since 2008 graduates are required to produce a written paper in English. Assignments have focused on design processes at both organizational and inter-organizational levels, with a focus on design teams within complex buildings and urban developments. Students have mapped and modelled processes to improve effectiveness, efficiency and design quality. The word 'architectural' in this context is meant to focus on the quality of the built environment to which designers, and more specifically architects, contribute. In general the students' investigations have been focused on analyzing design processes, focusing on perceived bottlenecks and searching for causes and explanations. From this they are able to re-order and systemise processes, delivering management tools for a specific organization or multidisciplinary design process.

Process design concerns the systemizing, structuring and modelling of design processes, or parts of the process, and the development of practical management tools. The assignments are concerned with: (a) the execution of case-studies during the programme (mostly executed in small groups), and (b) by the individual execution of the final in-company assignment. By performing such an assignment, a trainee has to show their competences and abilities to independently execute business oriented research, while being supervised and coached by a scientific team.

The assignments were executed for a variety of organizations and firms: large, well known architectural offices, combined architectural-engineering firms, consultancy firms, and advisory firms for building physics services and installations, project developers, care taking organizations, municipalities, county government, national operating real estate agencies and hospital related organizations.

Architectural design management needs to be recognized as an essential phenomenon in the playing field of concerned parties and actors in the planning process for new accommodations of organisations: clients and users. The corners of this playing field, as ADMS discriminates, are: client(s) and users; management of the project; architect(s) and specialist designers; building contractor and sub-contractors (see Figure 1).

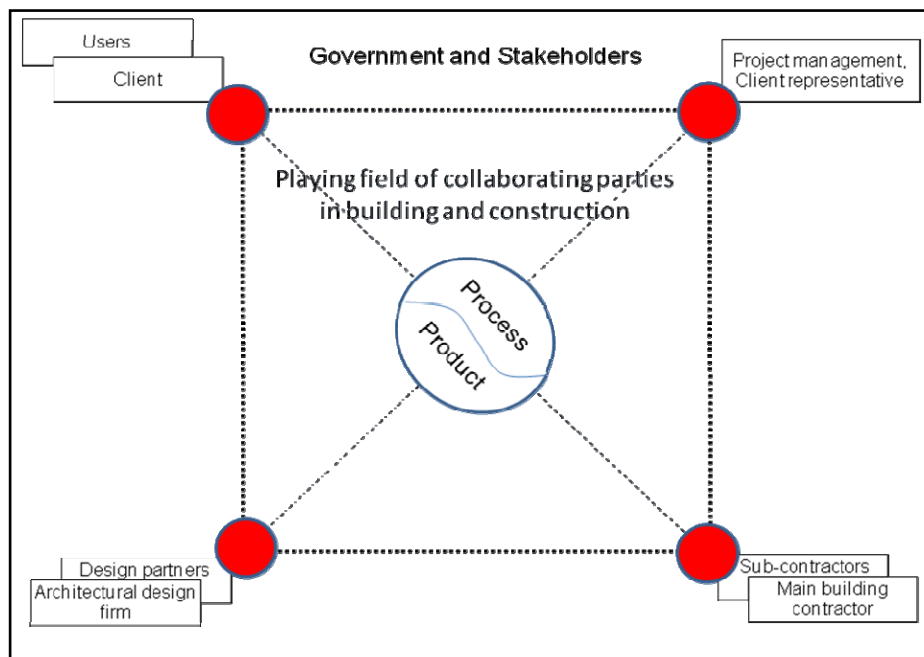


Figure 1 Playing field of collaborating parties in building and construction

In the playing field project management is identified as a specific party because of their contract with the client, mostly acting as the client's representative independent from the other stakeholders. This party mostly direct the project and its partners and controls the project goals to reach them within the specified quality, time and agreed budget.

Architectural offices apply design management depending on their specific capacities and market orientation, reflected in the contract with the client for delivering services (Emmitt, 1999; DNR, 2005). Large architectural offices usually have the capability to perform architectural and project management tasks successfully. However, based on the client's concerns in The Netherlands a project management company is often hired to direct the whole project. This includes the management of the design and construction process as well as dealing with the organisational move of client and employees, furniture, infrastructure and IT. Balance between design and project management tasks is necessary in such collaboration as demonstrated in the planning and realization of the Luxor theatre in Rotterdam (Demmers, et al., 1998), the planning and redevelopment of the Glass Palace Schunck in Heerlen (Fiedl, et al., 1999) and more recently the redevelopment of the Westraven offices in Utrecht (Erkelens, et al., 2005) and the development of the Mosa Forum in Maastricht (Beckers, et al., 2008). In the playing field the circle of design object and design process overlaps and might conflict in concern and interest (Doom, et al., 2005). Within this approach, on the diagonal connection between the design and management corners, the interest field of design management can be discriminated. The line represents the connection between product and content (designer's corner) and the product's development process (management corner) and focused both to the design content and the collaboration tasks and planning. A design process can be managed and controlled either by project management or by the designers, depending on the position, responsibilities and task of a design manager (Hendrata and Scheltens, 2003). The overlapping field in the middle is a symbolic representation of conflict in the management view that might appear due to differences in approach by project managers and design managers to design problems and possible solutions.

Government and external stakeholders are positioned outside the playing field because they have no contractual relationship with the client, despite the fact that they concerned with the project. Project management and managers tend to lower uncertainty in the beginning of the process to get a clear sight on the final result by using a linear process approach. By contrast, design management in general is focused to the design content as the best possible answer to the client's brief. This process is usually an iterative process that needs time searching for better insights into the problem and how to deal with it from new perspectives and perhaps a change in paradigm's to work and living spaces. This asks for sharing of knowledge, communication, negotiation and visualizing ideas, tuning of design, and stimulation of the team (Emmitt and Gorse, 2007).

3 Design management on organizational and inter-organizational level

For architectural design management we discriminate between management on organizational and inter-organizational levels, as highlighted by Dainty et al (2006). On an inter-organizational level investigations of the functioning and management of multidisciplinary design teams were performed for six different companies: a real estate agency, a governmental agency on regional level, a consultancy

firm, one of the largest project management companies in the Netherlands, a healthcare firm and for one of the professional research boards in the Netherlands in cooperation with a consultancy firm.

Compared to the in-company assignments ADMS delivered in the first five years (1998-2002), a move in subjects and companies occurred. In the first five years assignments were performed in the area of ICT use on organizational and inter-organizational levels, yet no assignments regarding ICT were executed in the following five years. A shift in focus can be observed to the inter-organizational level and for companies operating in the early design phases for starting a project. During the early years a lot of contracts and collaboration were based on the traditional contract model between the client and its main participants. A contract usually was made with the architect and the building contractor. In most large, complex projects an independent project management company was contracted by the client. In such multi-disciplinary projects the collaboration between the architect, the project management firm and the building contractor usually was not based on a contract (Figure 2). The in-company assignments executed during the last five years show differences concerning contracts and collaboration.

No focus to ICT use and assignments on organizational level, but much more organizations and companies, who operate in the early design phases for initiating projects, defining the program and configuring the team using various types of contracts (Erkelens, et al., 2005). The traditional triangle, centred to the client and users of the facility is changing in large, complex projects. Instead of centring to the client it is management oriented.

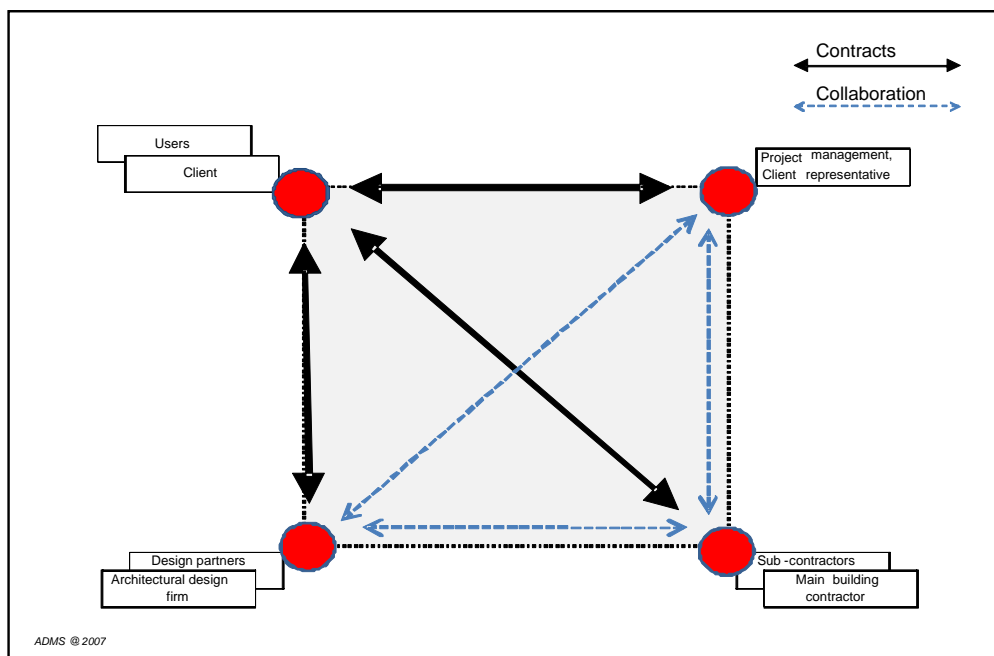


Figure 2 Traditional contracting and collaboration

4 Changes in contracts, management oriented

Project development mostly is focused to deliver design concepts or to deliver products based on repetition and variation on a basic product concept. Development focusing to the organization of the project in the early design phase, for delivering well studied concepts with high architectural values and new scenarios for project private partnerships to deliver and maintain the product during the life cycle. Project development, focusing on variation and repetition of basic concepts, try to optimize the detailed design and the execution of the product using contract forms like design & built or performance based building, but also on design, built, finances, maintain and operate (DBFMO) contracts. Also the building's life cycle became an issue during the past years and needs better planning at the start as well as better organizing the realization of the product and contracting participants that are able to provide life cycle services.

Regarding the opinions of the ADMS external advisory board, this change in organizing design and build processes will be intensified in the near future. This also means that future ADMS assignments will also be executed in the new triangle of design, focused to the capabilities and possibilities the producing firms offer (Figure 3). The assignment concerning 'Creating spaces of great value' executed for Rabo Vastgoed and the 'Manual for DBFMO tender procedures' executed for Arcadis are examples of such change that will also need investigations and analyses how to stimulate changes in the traditional building culture and how to intensive collaborations between the partners in such projects and contracts. Public private partnerships with a focus to privatizing public spaces, integral design approach with collectively used ICT on both the inter-organizational and organizational level might be subjects for such assignments.

5 Positions and responsibilities

In the conclusion to Emmitt's 1999 book the question was raised as to whether or not there was a specific role for an individual which could be termed an 'architectural manager'; a question that can, to a certain extent, be answered via the in-company assignments. Based on a review of the assignments, architectural design management needs to be better identified as a professional task and role that can be performed independently by a party that is hired by the client, or part of a project management task or as a specific task and role in an architectural office or design specialist firm. In the case of an independent party, a design manager has an important trustful relationship with a client concerning the content of the design. In the case design- and project management is a combined task and party, both tasks and responsibilities can be tuned very well although a trustful relation is needed with the architectural firm and the other design specialists. Because design management tasks might not be clearly defined in a project, architects and designing participants might perform these tasks although the responsibilities for this process are defined different in the contract, depending on how, from the project management perspective, the work packages are organized and work has to be delivered (Friedl, 1999).

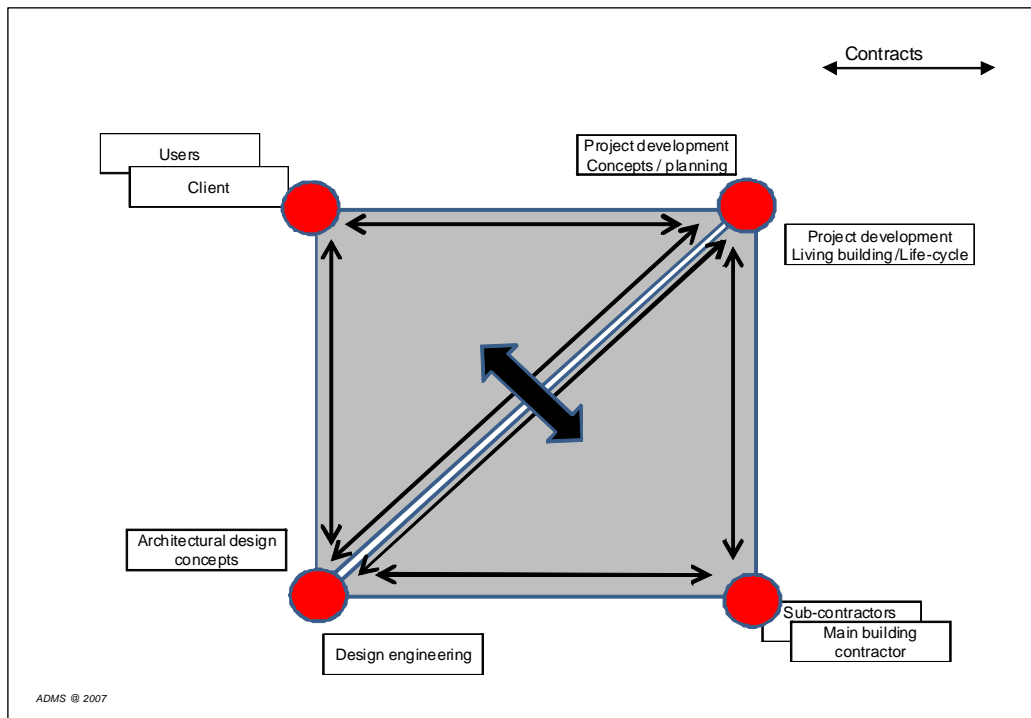


Figure 3 New contracts and collaboration oriented to management

If design management is clearly defined and organized in an organization or on inter-organizational level, based on a growing volume of evidence from the field, it enables designers to fully concentrate on the values of the design to be delivered. This easily results in durable designs highly responding to the client's demands and functioning better in practice. So it is important to prevent project management in the building and construction industry to become too much a checking organization to design organizations involved that focuses on the logistics of planning and progress of design instead of focusing to understanding, supporting the creation of synergy in design tasks of the various design partners involved. Size and complexity of building and construction projects are still increasing.

Such projects are increasingly based on public private partnerships in which governmental partners share governance with private partners or are based on DBFMO contracts in which consortia of consultancy, architects, advisors, contractors and suppliers signed to deliver the product and take responsibility for the building's lifecycle. In these situations the design teams are bigger, have greater responsibilities and are configured differently compared to traditional configurations. Thus the managing architects need better skills and better tools to direct and coordinate the design process, manage the progress of the design and for effective and efficient design communication. To communicate design, collaborative technologies (see Wilkinson, 2005) are need as well as building information modelling (BIM) to improve integral design and mitigate design errors. Design management in large design firms

and architectural offices most usually is a task of the architects because of their close relation to the client; however they might delegate such tasks for quality purposes and for better tuning of the various design tasks of employees working sequent on more than one project.

6 Concluding observations

Based on the experiences gleaned from the ADMS programme it appears that the performance of design management is greatly dependent on the type and complexity of the project, the contracting and team configuration, and the design management competences of the architects. It is clearly indicated in the assignments that due to the split in contracts for delivering design concepts and for product design and engineering, architectural firms and architects no longer easily get full contracts for delivering designs as in the traditional way. Consequently this leads to questions about quality, because in concept designs a lot of design aspects need to be developed and are not, or are poor documented (Demmers, 1998; Doorn, et al., 2005; Janssen, 2007). It appears that a growing trend is for project developers to leave the detailed design work to other designers responsible to the main contractor. With increased focus on the quality of design and the value to be delivered through design this raises questions about who is best positioned to deliver the best value to clients and also to questions over quality (Doorn, et al., 2005).

Both applied research and education are important within the ADMS programme. The 3TU School of Technological Design has set new criteria for the trainees' output that is grounded in rigorous scientific methods and draws on state of the art theories to produce innovative and practical architectural management solutions to real life challenges. The School is also focussing on facilitating possibilities to prove the value of the innovative models in practice in a scientific way and producing data about the testing and validation process. This provides the opportunity for the trainees to progress to a PhD after successful completion of the ADMS programme. As a unique educational programme, ADMS focuses on educating young high performers by teaching trainees how to gain the right competences in the field of architectural design management, thus enabling them to re-order and model design processes affecting design quality. Gaining the business knowledge, skills and abilities to model design processes and to perform well in the design process as a responsible party is paramount to the aims of the programme. Through this education programme we have found that designers can perform better because of greater insight and knowledge of design processes of complex building and construction projects, supported by knowledge of the latest business science developments relevant to the architectural, engineering and construction (AEC) industry.

The authors' experience, combined with feedback from the ADMS trainees, suggests that there is a need for more literature on architectural management. Early work on architectural management has helped to establish the domain. Future work should seek to explore in greater depth the theory and application of architectural management as a distinct domain. Obvious areas in need of further development and articulation relate to:

- (1) The philosophy and theory underpinning architectural management, and

(2) Appropriate tools and their application.

Many of the case studies performed by the ADMS students have potential to be published in English, and this is one area that could help the continued development of the architectural management knowledge base. Indeed, one criticism of the ADMS programme is the failure of the trainees to convert their research into peer reviewed journal articles. Publication has not been the remit of the programme, and given the nature of their work there may be issues of confidentiality which prevent publication, however, since 2008 trainees are encouraged to write academic papers and introduce them to the rigours of peer review. This should help them to develop their work and also help them to position their findings in relation to the larger body of architectural management literature.

Based on our experiences, observations and analysis of the students' work we can conclude that architects and architectural firms are increasingly challenged on their design management competences and their potential to perform at an optimal level in complex design projects. Due to the change from small collaborating teams, based on trust and mutual concerns, into big business teams responsible by contracts for the product and its lifecycle, architectural management needs to evolve. Quite often architectural firms need to deal with complex business cases that are not suited to their management competences. They also have to deal with new responsibilities, such as the lifecycle of the product, which adds further complexity to the management of architectural design. New technologies such as building information modelling (BIM) and communicating design by using collaborative technologies is also demanding and requires new approaches to management. Additionally, new professional demands for design management of projects are being set and expected by clients. For these reasons there is a need for more and better guidance for practitioners. To a certain extent this will come from the ADMS trainees taking their newly acquired skills into practice, thus helping to bring about positive change, but there is also the need for new literature on architectural (design) management that is written specifically for students (learning about architectural management) and practitioners (applying architectural management).

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建築師與管理：建築設計管理教育之反思

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摘要

自 1960 年以來，建築管理從一個為數不多的發行刊物轉變成一個重要的知識領域。該領域越形茁壯的理論基礎廣受實踐者好評，被用於改進各種計畫的規劃、設計與執行。然而，僅有少數的教育方案著重於建築之管理。本研究主要目的為藉由探討荷蘭埃因霍溫科技大學建築設計管理系統(ADMS)之技術方案，以檢視建築管理發展之成果。此獨特的專業博士課程，可讓學員藉由學校教育與實踐經驗之結合，發展自己的能力。在過去十年來，學員們完成了超過 75 個建教合作案，經審視後找出了實踐與教育的相關問題，並了解了建築管理之未來趨勢。

關鍵字：應用研究，建築管理，教育，知識領域，實踐