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An analysis of UK architecture students' reflections on their year-out learning experience in practice and their integration of knowledge learnt in both architectural offices and universities.

Architectural students' year-out training experience in architectural offices in the UK

Yun Gao and Kevin Orr

This article investigates architectural students' 'year-out' learning experience in architectural offices after completing RIBA Part I study within a UK university. By interviewing and analysing their reflections on the experience, the study examines how individual architecture students perceive and value their learning experience in architectural offices and how students understand and integrate what they have learned through two distinct elements of their training: one in university and one in practice.

The architectural offices that students work with vary in terms of workforce size and projects undertaken. The students' training experience is not unified. The processes of engaging with concrete situations in real projects may permit students to follow options that most inspire them and to develop their differing expertise, but their development in offices can also be restricted by the vicissitudes of market economics. This study argues that creative design, practical and technical abilities are not separate skillsets that are developed in the university and in architectural offices respectively. They are linked and united in the learning process required to become a professional architect. The study also suggests that education in the university should do more to prepare students for their training in practice.

'[…] creative design, practical and technical abilities are not separate skillsets that are developed in the university and in architectural offices respectively.'

The relationship between architectural education and practice

The construction industry in the UK has gone through many changes over the past fifty years. The changes are reflected in new materials and technologies, and the transformation of the role of architects. Proposals have recently been discussed to market architectural education as a wide-ranging non-vocational university subject because more than 20% of former RIBA Part 1 students do not continue to professional architectural qualification.[1] With the pressure of optimising the learning period in the university and the need to work within the European architectural registration system, new pathways have been discussed in UK architecture schools to bring together learning in the university and more flexible routes for students to work in practice. This study focuses on the transition between academia and industry in terms of how students learn and develop in their year-out training period in architectural offices after typically three years of study at university.

When Geoffrey Broadbent traces the development of architectural education in the West, he suggests that architectural education has always been in close relationship with practice.[2] Before the Renaissance, he has argued, architectural training was more about learning in practice. The figure of Leon Battista Alberti illustrates this, following Broadbent's account, Alberti's writing showing how theory in architecture emerged and was united with practice, with Alberti an active author and humanist scholar as well as a successful architect.[3] When the Academie Royale d'Architecture was set up in 1671 and the École Polytechnique in 1793, their syllabi for architects included lectures in the theory of architecture, the history of architecture, and in construction, etc. The Bauhaus model also encouraged teaching theories and appreciation of the notion that 'making' remains a key component in the process of learning.[4]

Michael Eraut suggests that the transformation of large areas of the professional knowledge base into codified forms in textbooks held in the universities had divided professional courses into separate credit-bearing units and examinations.[5] In Eraut's opinion, such segmentation affected the teaching and the nature of the knowledge being mediated and assessed. This is experienced differently in architecture. In contrast to academic study in the university, great weight was attached to professional judgement by experienced professionals to make decisions in the light of limited evidence in practice.[6]

The inherent educational strength in architectural studio teaching is 'learning by doing'.[7] In studio, knowledge is transferred and disseminated through

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drawings together with other media. Assessments of students' design projects are based on tutors' academic and professional judgment based on the assessment criteria. Can architectural education with learning in the studio benefit the transition between academia and industry?

Previous studies have criticised design studios that developed their own language, potentially discouraging communication with users and other stakeholders, and were separated from the uncertainties of, and changes in, society.[8] However, a university is not a totally enclosed unit. Pedagogy developed following government policies that assessed social impacts.[9] In recent years, '[t]echnologically-oriented architects influence disciplines even more than architecture as ubiquitous images and texts in the internet generate more rapid and hybrid spread ideas', as suggested by Richard Coyne.[10] Practice-based research also demonstrates the close link between creative design and academic and practical knowledge.[11] For example, proposing to move from 'critical from distance' to 'critical from proximity', Teddy Cruz discussed projects that encroach into the institutions to transform them from the inside out.[12]

Until relatively recently, much research on training in UK year-out placements tended not to consider the mutually dependant relationship between so called formal and conscious learning in the university and unplanned, unconscious learning during placements.[13] However, rather than viewing work solely as a context which students learn *about*, David Guile and Toni Griffiths argue that it is important to appreciate that work, like education, is a context *through which* students can learn and develop.[14] Adrian Snodgrass and Richard Coyne also point to the mutually-dependent relationship between learning in the institution and in practice based on a development of the term 'practice' derived from the Greek word *praxis*.[15] The key to understand how students work in the practice, according to Eraut,[16] is to understand that learning knowledge and using knowledge are the same processes. Particular to the subjects in design, Bruce Archer also suggests that skill and thinking are not separated.[17]

'[…] the mutually dependant relationship between so called formal and conscious learning in the university and unplanned, unconscious learning during placements.'

For architectural students, the typical route to qualifying as an architect in the UK today is a combination of academic studies and practical experience, defined by the Architects Registration Board and the European Professional Qualifications Directive and as expected by the RIBA. It currently involves typically training for five years at university and a minimum of two years' experience before final qualification. Hence architectural practice is an inseparable part of the process for students to become architects.

RIBA Validation Criteria at Part 1 and Part 2 (last revised 2011) define the learning outcomes for architectural year-out studies as to understand more about the profession of architecture and the role of the architect in society.[18] However, some key relationships between the skills and knowledge learnt in the university and those gained in practice have not been detailed in the RIBA or ARB documents. There is also little research on how learning develops in architectural offices. A previous study by the authors examined architectural students' year-out experience as both a learning and development process.[19] This study seeks to know more about how year-out students value the knowledge they learnt in the university and to seek answers to the following questions:

1. How do architectural students perceive and value their learning experience in architectural offices?
2. Can students influence the practice in any way through the knowledge learned in the university?
3. How do they critique the studio teaching and learning after the year-out training?

Research methods

This project employed in-depth unstructured interviews. Students who participated in the interviews had completed their three-year undergraduate study at universities in the UK, mainly in the north of England. They worked in architectural practices during 2010 for their year-out experience as required by RIBA Part I training. Eleven male and five female students participated in the project *[1]*. The architectural practices where the students were placed ranged from multinational companies to small companies with less than five staff, including two sole architect offices. The group of students was selected according to the availability of participants and their willingness to take part.

The principal northern university where the students completed their undergraduate study became a university in 1992 (it was formerly a polytechnic), although its antecedents can be traced back nearly a century. Its intake is primarily local/regional and the majority of participants were the first generation of their family to attend university. Due to the economic situation at the time, many only found their year-out job after contacting numerous architectural offices.

Apart from three pairs of students who worked in the same architectural offices, all the other participants were interviewed individually. Each session took thirty to sixty minutes. The *a priori* codes we used for analysis of the interviews related to: social contact on placement; learning; and perceptions of architect's roles. The emergent codes related to: the relationship between creative design and specialised knowledge; responsibility while on placement; and the level of architectural understanding.

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Findings

Social interactive environments

The majority of participants worked in architectural practices with open-plan offices, although one practice had separate offices for staff because they occupied three floors in a small building. Directors of the company normally sat in their own sections with partitions within the open space that made it easy for them to walk out and communicate with others. The rest of the staff, including associates, architects and assistants who are involved in the same projects generally sat in groups.

Year-out students were expected to work primarily with architects who functioned as their mentors and decided their workloads, but many also stated that other staff in the offices concerned were very supportive when they had questions. Like the learning environment in academic studios, communications and discussions were generally encouraged in the office. It had been a long tradition for architectural staff to exchange opinions about projects in front of drawing boards in the offices. Despite the difficulties of looking at drawings on much smaller computer screens, it was still common practice to discuss designs and technical details around drawings on-screen, and to have second opinions and input from experts in particular subfields. The aim of a discussion was not necessarily to produce a better product, because very often people preferred to talk about a particular problem to a colleague afterwards to reflect and to hear different opinions and feedback. There was no single right answer to each particular problem, and people's experiences and ways of delivering a design idea varied. In this environment, as participant Sophie commented, the open plan was 'extremely beneficial' as students could learn by hearing and this started to inform the way that they conducted themselves as professionals.

'Desirable experiences for students were communication with other members in the design teams and visits to the site to see how the buildings were built.'

There are many forms of social interactions in the office, for example, a rota system to make the tea or coffee, taking lunches together, or having a Friday afternoon gathering in the local pub. Hierarchy was, however, reflected in the tasks arranged for architects and assistants. Year-out students who work as architectural assistants generally completed computer drawings based on the architect's designs and drew up construction details. Design work was generally reserved for experienced architects who had overall knowledge of factors such as materials, structural availability, cost, and legal requirements. Desirable experiences for students were communication with other members in the design teams and visits to the site to see how the buildings were built.

Students' skills and knowledge learnt from university were valued in offices. It was a shared view that people have different perspectives and alternative ways to solve a design problem and students were encouraged to give opinions when the project allowed more experimentation, as participant Andrew said 'one of the directors [...] seems to be very design orientated and so [...] he was pushing me for ideas to try and get ideas out of me'. The model of communication between teachers and students in the studio was followed in practice. As Donald Schön has explained, that new meaning is discovered through joint experimentation of teacher and learner, reflection-in-action within the lesson itself.[20] Despite being inexperienced in management skills and lacking the technological knowledge to deal with on-site construction, students were given opportunities to voice their opinions on the design. Participant Andrew said: 'They [the architects] give you a bit of artistic license in what you're doing [...] and they do encourage you to give your opinions on things [...] You will be heard if you challenge a few things.'

One participant, Sam, found his skill in computer drawing, especially 3D modelling, to be an advantage because, by helping with drawings for different projects, he was given opportunities to go to site and be involved in client meetings. Yet, within the interactive social environment in architectural offices, it was clear to the students that this office environment was different from the studio in the university. Learning by working as paid employees in an architectural office also demanded that the trainees act as professionals even before they qualified as architects. When Sam answered inquiries about projects on the telephone, he was conscious that the rest of the office was listening; 'like an assessment'. If he did not know the answers, he was expected to pass the questions to other more experienced colleagues.

The quality of students' work was sustained by means of asking and checking, which is an essential part of professional training. As the RIBA's requirement for year-out students defines that candidates must be mentored during their practical experience, a definition of 'direct supervision' means that the employment mentor should have control over and take responsibility for the work being undertaken.[21] Staff in the office are committed to the system of training. Sophie was a newly qualified architect. Talking about her as a mentor, she said: 'I'm still learning but part of my role is to give bits of work out to people – usually students – to do and there is a temptation, if the work comes back and it is not exactly what you wanted it to be, to do it yourself because it might only take ten minutes but I've got to send it back to them and say that it's not quite right.'

From the interview data, students were generally supported by office staff to gain various experiences recommended by the RIBA. Andrew worked in a large company with three branches in London, Cardiff, and an overseas office. The Director of the Office tried to move them around on various projects every three or four months so they could acquire different skills.

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People helped with different aspects of work, some with the design aspects and others with management and communications.

Real projects for year-out students

In the research, all the participants believed that understanding how an architectural office operated, and procurement processes for construction, could not be taught in the university; one has to go to the office to gain the knowledge because there were a number of elements beyond the scope of academic studios. The first is to form the brief and execute the design through interactions with stakeholders such as clients, planners, and contractors. Second, the restriction of budgets and planning considerations had huge impacts on design. Thirdly, students were impressed by the need to design the building in detail for it to be priced and built. As Nick said, design to the 'door handles'.

'[…] all the participants believed that understanding how an architectural office operated, and procurement processes for construction, could not be taught in the university.'

Diane's experience was that 'at work we have the contractors or the clients and they all have a say and can change things […] There are completely different hierarchies from design in the university.' Sam had been involved in a number of housing projects in which the clients had different opinions about design and had fallen out with the original architects. He redesigned a small dwelling extension a number of times because client's brief for the project changed constantly and funding was cut. Planners' preference for a 'modern style' also affected design decisions substantially.

To have knowledge of management, and to play the right role according to the contract and relevant laws, was also understood as part of daily work. When Tiffany worked on a school project, she was reminded that the Education Service rather than the school was their client on the contract. She learnt in the site meetings that: 'Contractors and engineers were on different sides […] You need to hold your ground.'

Students' experiences in practices were varied. The architectural offices students worked with were very diverse in terms of the kind of projects they took on. Even if it was within a single office, 'people tend to do things that they are good at and feel comfortable'. Recessionary economic circumstances also meant that some students had to work for periods in design-related companies rather than architectural offices. Oliver worked in a company designing playgrounds and skate parks. Hanna worked in a company designing bespoke furniture.

Students' experiences were also influenced hugely by the projects they undertook. Generally, people in larger practices had larger scale projects in which students tended to work on smaller parts, whereas students in smaller offices had more opportunities to manage their own jobs. Andrew 'would enjoy getting the experience of a smaller practice and doing some more personalised architecture'. Having worked on many small house extensions, Sam liked to work on different projects in larger practices. Judith learnt a lot about timber and masonry in her job in council planning department, but she would like to know more about steel frame construction and cladding as such items, she suspected, would be used more often in her future practice. Despite working not in an architectural company but designing playground and skate parks, Oliver had a most valuable experience of management when his mentor left him in charge of the projects. However, he would have preferred to work like 'an architect' to creatively design a building and get it built.

Developing an understanding of the role of architect

One presumption about workplace learning was that creative design thinking needed in academic studios was not required for jobs such as the routine administration and technical computer drawings in the office. This is contrary to what was found in the interviews because the priority of what to learn had changed. Adrian Snodgrass and Richard Coyne comment that: 'Interpretation is a reconstruction, and "(o)ne has only understood what one has reconstructed in all its relationships and in its context".'[22] The process of executing the design in practice is to weigh up one possibility against another, decide the construction details based on the client requirements, available technology, materials, and builders' skills. For architects, as Horst Rittel suggested, the outcome of designing is not the accomplishment of the purpose, but a plan for its accomplishment, thinking before acting.[23] The same priorities as those in the academic studio, both tacit and explicit, and subjective and objective knowledge, are needed in the process of producing drawings as well as word documents.

By being involved in the execution process of the design, Sarah learnt 'a lot about finding products and specifying details such as the schedules and specifications for each job'. For Judith, 'looking at the whole process, and aware(ness) of the cost for each stage' was important. To design buildings that were going to be built and to be used made Tom felt that 'I'm a better designer.'

Students' sense of achievement has changed from creating innovative concepts and images to the improvement of the existing situation that can be beneficial to others. Judith designed a simple small house, without 'having any say in design', but the clients 'loved' it as this was what they wanted.

'The same priorities as those in the academic studio […] are needed in the process of producing drawings as well as word documents.'

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Name of trainee	Placement setting	Specialised projects	Level of responsibility
Judith	Small office in a small town, two partners (one registered architect), three associates (one is registered architect, another very experienced but unqualified architect and one technician), two architectural assistants, one CAD technician, work in a three-storey renovated house	Primarily domestic contracts	Assisting others on drawings. Have been to site visits and meeting clients
Tiffany	Architects department of a local council with 26 staff, half architects and half architectural technologists, one manager and two principal architects	Mainly refurbishment	High level of responsibility with own projects
Andrew	Large architectural office with three branches in London and Cardiff, and a small overseas branch (with Catherine)	Commercial buildings including BBC production studio	Assisting others on drawings
Catherine	Large architectural office with three branches in London and Cardiff, and a small overseas branch (with Andrew)	Commercial buildings including BBC production studio	Assisting others on drawings
Hannah	Medium-sized city centre firm with 15 to 20 staff in a three-floor building. One manager, as the qualified architect, many architects, interior designers and technologists	Heritage work	Little responsibility for architectural work, but did many interior drawings including furniture drawings
Alex	A small practice with 6 staff in a small city. One main director and conjoined with another structural engineering team	Housing and conservation works	Mainly assisted other architects but later had his own project
Diane	(Completed BA degree in a university in southern England). Medium-sized firm with 20 staff, architects, 5 architectural assistants, and three technicians	Hospital and NHS Office refurbishment	Construction drawings and went to site
Sam	Sole architect works in converted home. Trainee based at home, communicating with the architect by phone and email	Housing and sports facilities	Drawings and went to site and client meetings
Richard	Medium-sized firm with two principal architects, two technicians, one Part I student and one Part II student	House development and hospital	Computer drawings, but no site visits
Alice	Sole architect in a rural area working in architect's home (with Jack)	Expert for disabled clients and sustainable buildings	Assisting others on drawings and went to client meetings to listen
Jack	Sole architect in a rural area working in architect's home (with Alice)	Expert for disabled clients and sustainable buildings	Assisting others on drawings and went to client meetings to listen
Charles	Sole architect plus Charles	School projects and domestic jobs	Drawing and attending site meetings
Tom	Small office with two branches. The office Tom worked with had one architect, one technologist, an interior designer, and one architectural assistant	Residential works	High level of responsibility with own projects
Oliver	Design firm for playgrounds and skate parks with 3 technicians for 2D plans and two 3D designers	Playgrounds and skate parks	Design and draw plans for playgrounds
Nick	A medium-sized office with 22 staff, together with in-house structural engineer and a quantity surveyor, not only working on architectural projects but also graphics, educational publishing	Housing	A certain level of responsibility with own projects
Sophie	The same practice as Nick. A medium-sized office with 22 staff, together with in-house structural engineer and a quantity surveyor	Housing	A newly qualified architect with high level of responsibility with own projects

1 Table of Interview Participants

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Tiffany felt proud when she saw one staircase was erected according to her drawing because 'thirty-two children and two staff go up here several times a day and it works!' In this study, half of the participants worked on small-scale projects, as Jack claimed:

> *I think you don't have to be a genius actually* [...]. *At the beginning I was a bit daunted because all of the architects you look at are these big name architects who seem as if they were born that way. I felt that I couldn't achieve that, at one stage, but having met more than one architect I can see that they are just ordinary and honest people* [...]. *It makes me feel that being an architect is more achievable and it's not something out of reach.*

Architecture is not just about visual images any more, it had become 'how things work', 'how plans and sections are worked out' and 'how buildings are built'. This new understanding brought a different judgement of which aspects in the design project were more important. Creative designs, here, are not seen as mysterious and beyond comprehension. Good ideas need to be executed systematically and connections need to be built between different aspects. If study in the university encouraged new theories and broadened the boundaries of knowledge, practice experience valued 'used and tested' methods as essential measures to support the professional judgement.

There was a general understanding between staff and students that people could learn from mistakes and learning continued through one's career because of the changing nature of the industry. Tom said:

> *Everyone makes* [mistakes] *and provided they don't have any long term consequences, it's fine. You can never know everything and someone who's been in the job for forty years is still learning* [...]. *I think you learn more sometimes from making mistakes.*

More than treating rules as universal applied principles in order to understand or explain as scientists do, architectural professionals deliver designs by accommodating changes and making modification constantly. A good example is that staff attended Continuing Professional Development (CPD) sessions delivered by building product manufacturers about new products at lunchtime and used those in the next projects.

Unifying knowledge and skills in the practice and university

When asked about whether knowledge learnt at university affected learning in architectural practice, participants discussed this in two respects. First, students felt that they had to have year-out training in practices to negotiate with different people, to participate in the stages of the construction process and to understand more about the technology and materials, and 'one could not achieve this in the university'. Diane studied in a university in the south of England, and she felt that first degree was very much 'arty and conceptual', and 'going into practice was a complete leap into the unknown because I didn't have the first idea of how to operate'.

Jack is a student who liked making things. 'I had this theory in my mind', Jack said:

> *that architecture should be more hands-on but when we were working in the practice* [...] *I could see there was a divide immediately between the builders and the architect and, for me, that reinforced my view that architecture should go back to its roots of being a master builder kind of thing and be more hands-on so that you really know the building inside out* [...]. *I think it's possibly too difficult to achieve because of all of the work at that architect has to do already.*

But Andrew and Catherine had different views on this. They believed that although their technical knowledge improved enormously in the architectural practice, the studio had its own advantage because:

> *When I go back to university you still need to be as creative as possible. Because you do work under constraints in industry with budgets* [...]. *You miss the freedom that you've got in your brief at university.* [...] *At university I guess you create a cycle which I think you need because, especially with the constraints of the industry, I can see how some architects just give in to that sometimes rather than pushing to create a really good design. So I think it's good that the university pushes creativity.*

Richard appreciated the learning in the university that gave him, as Pierre Bourdieu puts it, 'a cognitive acquirement, a cultural code':[24]

> *A lot of people think that you should be getting taught the ins and outs of regulations but I think when you are getting taught theory it's different because you are getting taught how to think about architecture as well as just how to do it and so you can be a little bit more in tune with it* [... It] *helped me have* a voice [author's emphasis], *I suppose, rather than just being this sort of robot and I was able to actually say what I thought about the design and how I felt I could improve it.*

'"you do get pigeonholed quite early on in your career [...] people will pick up on your strengths and they will use you for that".'

Sophie talked about her view that it was design that attracted many students into architectural courses, and kept people's enthusiasm about work in practice. As Tiffany claimed, all the architectural managers or partners 'who are supposed to dole out the projects and just have the odd say here and there' still engaged in design work whenever they could. But there is much more than design in the practice, and 'you do get pigeonholed quite early on in your career [...]'. As Sophie commented, 'people will pick up on your strengths and they will use you for that'. After failing to find a job after a number of interviews, Tiffany reflected that many practices employed students based on their technical knowledge rather than their design abilities, but the majority of technical skills were learnt in practice rather than being taught at the university. Nick had a similar experience and questioned why universities did not prepare students better with basic practical

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skills and knowledge, and why there was not a medium between academic aims in the university and practical needs in the office.

Learning by doing

This study has demonstrated that architectural students' learning and development in practice continued through 'learning by doing' and used drawings as primary design and communicative media. Working in offices gave weight to both explicit and tacit knowledge and used subjective judgments. There was also a developed understanding of design as an activity involving more conscious thoughts and reflections and careful explicit consideration of context in practice.

Another development perceived in practice is a further understanding of what architects are and what they do. Contemporary media images of architecture and urban environment are increasingly dominated by iconic architecture and star architects, which perhaps attracted students into architecture courses in the first place. The majority of participants in this study came from unexceptional backgrounds and the projects they worked on in architectural offices were primarily everyday buildings. The architects that the students worked with were also 'ordinary people' who tried their best to negotiate different constraints in order to have buildings built. This reality was what discouraged some Part I students from progressing into the next stage of architectural education, Part II, but for others it demonstrated that a career in architecture was 'achievable'. The participants who continued into Part II studies acknowledged that their decisions to continue were largely encouraged by people in the offices where they worked. But in the participants' opinions, the learning that took place in universities did not sufficiently prepare students to overcome the hurdles of entering their placements and starting with sufficient confidence in their architectural offices.

The study shows that students' learning and development in architectural offices are not unified, not only because they worked in different architectural offices and with varied projects, but also because they had different understandings of architectural learning. Some believed that one should be 'learning by practicing' while others believed that study in the university had freed the students from the constraints of the commercial world. Yet it was the design aspect of architecture that attracted many students into architectural courses and gave them enthusiasm in architectural practice.

Recent discussions of how architectural education should keep up with changes in the profession and the curriculum have focused on transforming architectural education into a wider ranging non-vocational university subject. Focus here is more upon shorter architectural courses and flexible design pathways rather than improving the quality of current professional performance or preparing students better for placements in architectural offices. Questions can therefore be asked as to whether Part II study in university can renew and develop students using the knowledge arising from their personal experience in the year-out and to help them to reformulate the theories of practice.

'Some believed that one should be "learning by practicing" while others believed that study in the university had freed students from the constraints of the commercial world'.

The study also investigated whether students could influence practice work in any way, apart from their skills with CAD drawings and introducing fresh conceptual ideas; in other words, whether inputs from the universities can encourage the growth of the professional knowledge base. Much practice-based research has led the development of organising and codifying knowledge accumulated within the profession as well as broadening the boundaries of knowledge when researchers are producing creative and academic outputs at the same time. Student interviewees commented that however design might be executed in practice, they felt almost exclusively subject to the limitations of the economic situation. In practice, they felt more rewarded for their technical knowledge than for creative ideas. Yet, on the other hand, year-out students were assessed in job interviews through presenting their portfolios with prominence given to design projects completed in their universities, and were encouraged by the architects to continue their Part II studies. It can be argued that, rather than separate the two processes into learning design and theories in the university and learning to build and manage in architectural offices, these skills and knowledge are linked and united in the learning process that is required to become a professional architect. As Bruce Archer has suggested: 'In design, the repository of knowledge is not only the material culture and the contents of the museums but also the executive skills of the doer and maker.'[25]

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