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new planning undergraduate course**

Nelson, S.

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Investigating collaborative interdisciplinary practice to develop a new planning undergraduate course

**Paper presented at AESOP Congress 2017, Lisbon, July 11-14
Suzy Nelson, University of Westminster**

Introduction

This paper discusses research undertaken to develop a new planning undergraduate degree aimed at educating design literate planners. It begins with a review of academic literature advocating interdisciplinary and design approaches to tackle challenging real world problems. The paper then discusses the increasing emphasis on the employability of university graduates. It goes on to review literature on the current practice of the built environment professions in the UK and identifies a gap in the literature on interdisciplinary practice. The findings of an exploratory study of collaborative architectural and planning practice in the London area, aimed at addressing this gap and embedding the new course within a wider community of practice, are then presented. The paper concludes with a discussion of how the research will inform the development of the course.

Interdisciplinarity

Interdisciplinarity has become widely advocated in research and teaching. It is seen as playing a crucial role in solving complex real world problems which cannot be adequately tackled by a single discipline. Since the Enlightenment knowledge has become compartmentalised in 'a myriad of separate disciplines' (Ramadier, 2009 p. 423). This has resulted in most knowledge being currently organised, produced and applied in highly fragmented way, which limits our ability to address pressing global social and environmental problems (Clark & Wallace, 2015). Interdisciplinarity draws on a number of disciplinary perspectives to provide practical solutions to problems and to develop a more coherent body of knowledge. Different degrees of collaboration and integration of knowledge are described by the terms, multidisciplinary, interdisciplinary and transdisciplinary. Multidisciplinary working tends to be used to describe teams where disciplines remain distinct, whereas interdisciplinarity and transdisciplinarity involve greater integration of knowledge. The boundary between interdisciplinary and transdisciplinarity is somewhat unclear; Aram (2004) suggest that 'An effort becomes more transdisciplinary as established expectation for generalizability of knowledge are diminished in the interests of social problem solving.' (p.407). However, the term interdisciplinary is much more frequently used by practitioners and will therefore be used in this paper.

Planning itself is often described as an interdisciplinary profession. In the UK the profession has its origins in the architectural, engineering and surveying professions (Cherry, 1974) and planning continues to draw on a number of more established disciplines (Davoudi & Pendlebury, 2010). Ellis et al (2008) point out that multidisciplinary working is important to planners as the

dominant paradigm in planning theory is one in which 'planners are portrayed as facilitators and mediators of different interests and expert opinions' (p. 75).

Schön (1984) argued that a design approach could be beneficial to a wide range of professional disciplines. He pointed out the limitations of the rational technical approach based on scientific knowledge in tackling practical problems in uncertain, unique and conflict-laden contexts, and highlighted the advantages of a reiterative design approach in developing practical solutions. Although the planning profession initially had a strong design focus, since the mid twentieth century in the UK and many other countries, it has shifted to a social science focus (Frank et al, 2014). Van Dijk (2011), whilst acknowledging a renewed discussion amongst planners about the design of urban form, suggests that design can play a wider role in developing narratives of change in cities and regions. He argues that design needs to be seen as much more than an aesthetic afterthought and that a reiterative, interactive process of exploring problems and possible solutions can enable communities to actively engage in shaping their environments.

In the UK, policy makers as well as academics have increasingly acknowledged the benefits of interdisciplinary working across built environment disciplines. Due to concerns about the poor quality of the built environment and the need to promote sustainable development, UK Governments have initiated a number of reviews of the construction and development industries (Latham, 1994; The Construction Task Force, 1998; The Urban Task Force, 1999; Egan, 2004). Although these reviews had varying briefs, they all recognised the need for better integration of the processes and teams involved in the production of the built environment. The Edge, a multidisciplinary think tank, commissioned a report on the future of the built environment professions. This report considered that one of the key challenges facing the professions is that 'they tend to reinforce silos and to preserve hierarchies, when the requirement is (or may be) for increased integration of services for clients' (Morrell, 2015, p. 25). It considered that the professional institutions had not kept up with the growth in multidisciplinary practices and the increasing number of practices that are companies with external ownership. The report recommended greater collaboration between the professional institutions to improve their offer to society and to tackle issues such as climate change. It also recommended reviewing the siloed nature of the built environment's education system and the promotion of a cross-disciplinary approach to education. The Farrell Review of Architecture and the Built Environment (2015) was an independent review, led by the architect Terry Farrell, aimed at influencing both government policy and industry practice. It argued for a more proactive approach to planning, with an emphasis on place making:

'It is only through proactive planning that we can shape our built environment in a big-picture way to meet the social, environmental and economic needs of future generations' (The Farrell Review Team, 2015, p. 73).

The Review recognised that this could only be achieved through architects, planners and urban designers working together and argued for the creation of 'an interdisciplinary workforce, able to break through the existing silos of working that are hindering our built environment today' (The Farrell Review Team, 2015, p. 64).

Interdisciplinary Planning Education

Roos and Frank (2016) argue that planning education needs to prepare students for working in interdisciplinary environments. They note that there have been many innovations in interdisciplinary education such as joint foundation years and shared projects, but point out that these initiatives have not always been successful because interdisciplinary education is complex, resource intensive and requires substantial institutional commitment to be sustained. Most of the current interdisciplinary initiatives in planning education in the UK have involved introducing interdisciplinary modules. McCarthy and Bageen (2014) detail a number of such initiatives; most involved planners working with other built environment disciplines and one involved working planners working with medical students. Initiatives that embed the concept of interdisciplinarity across the whole programme are rarer. In 1994 the University of Cambridge introduced a part-time masters course in Interdisciplinary Design for the Built Environment for early career professionals who had a previous professional qualification (Jupp and Macmillan, 2010). This course was jointly initiated by the University's Departments of Architecture and Engineering and whilst those taking the course include planners, the majority of its students are either architects or engineers. In 1996 the University of the West of England set up a joint four year architecture and planning undergraduate degree with joint accreditation by the Royal Town Planning Institute (RTPI) and the Royal Institute of British Architects (RIBA) (Manley & Parnaby, 2000).

The University of Westminster's new undergraduate degree, BA Designing Cities aims to embed interdisciplinarity through out the course programme. It aims to prepare students to work as planning practitioners with design skills who will be able to work effectively in an interdisciplinary context. We decided against a jointly accredited course in part for pragmatic reasons. Meeting the accreditation requirements of two professional bodies would inevitably have involved considerable negotiation and would have required a longer period of study, four years rather than the usual three required in the UK, which we were concerned would not be popular in the context of rising student debts. We were also aware from the experience that the employment market for graduates of our planning masters course was buoyant. Moreover, our initial dialogue with practitioners suggested that planners who had additional skills in design would be particularly in demand and this was echoed by the Farrell Review (2015), which highlighted the need for design literate planners.

Graduate Employability

Employability of graduates has become an increasing priority for universities (Holmes, 2013; Jackson, 2016; Blair & Manda, 2016). Jackson (2016) argues that employability is about more than skills and knowledge, and that students are best prepared for practice through being encouraged to develop a pre-professional identity through engagement in a community of practice. Planning is a vocational subject and planning education has always been intended to prepare students for professional practice. In the UK the RTPI

plays an important role in planning education. It sets learning outcomes for initial planning education and partnership boards made up of practitioners and academics are responsible for accrediting and monitoring degrees (RTPI, 2013, 2015). However, this formal engagement with the profession is on its own not sufficient to ensure employability of graduates. The RTPI's own information on current practice is somewhat limited. The most recent survey of its membership, conducted in 2013, focussed on what services members wanted from the RTPI and only had a 25% response rate (Koch and Harris, 2014). Due to this lack of detailed information about current planning practice and a desire for greater engagement with practitioners we decided to undertake research on the nature of collaborative interdisciplinary planning and architectural practice in the London area to ensure that the graduates of our new degree programme would be well prepared for employment.

The architectural and planning professions in the UK

The research began with a review of relevant literature about the professions, current practice and interdisciplinary working. In the UK, professional bodies formally constituted themselves as membership organisations in the nineteenth century. Architects followed doctors, lawyers and engineers in establishing professional bodies; the Institute of British Architects was founded in 1834 and was granted a royal charter in 1837. Planning is a newer profession. The Town Planning Institute was founded in 1914, but did not obtain its royal charter until 1959. Since the 1970s, urban design has been an emerging specialism at the interface between architecture and planning. Urban designers are not at present represented by a separate professional body.

By the early twentieth century the RIBA had established a dominant position amongst practitioners and it was able to successfully lobby for the protection of the title of architect (RIBA ARB Review Group, 2004). Since the Architect's Registration Act 1931, only those meeting agreed standards are legally permitted to call themselves architects. This legislation introduced state-backed self-regulation of the profession, as the majority of the membership of the registration body, the Architects Registration Council, which it established, were architects.

Following the first planning legislation in the UK, in 1909, there were differing views about which profession should take the lead in its implementation. An interdisciplinary approach prevailed and a number of architects, engineers and surveyors who were engaged practically in town planning came together to set up the Town Planning Institute (Cherry, 1974). Membership was only open to existing members of the architectural, engineering and surveying professions, who had practical experience in town planning. The Institute drew up an examination syllabus for prospective members; initially only members of the founding professions were eligible to sit the entry examinations. It was not until 1932 that direct entry to the profession via intermediate and final examinations was permitted for the first time. Following the introduction of a comprehensive planning system in the UK in 1947, the British Government set up a committee on the qualifications needed by

planners. Its report placed less emphasis on design skills and more on social science (Schuster, 1950). It stimulated the teaching of planning as an independent subject in higher education and helped the institute to break away from the founding professions. However, due to continuing opposition from the founding professions a royal charter was not granted to the Institute until some years later (Cherry, 1974).

In the period following the Second World War, when the state was active in post-war reconstruction and in building new housing and social infrastructure, planning was a largely public sector profession and a large proportion of the architectural profession was also directly employed by the state. During the 1980s and 1990s, the neo-liberal Conservative Governments in the UK had a considerable impact on both professions, due to policies promoting competition in the market for professional services and cutbacks in public expenditure. The Warne Report reviewed the protected title of architects and recommended its abolition (Warne, 1993). However, the RIBA, along with the National Consumer Council, successfully campaigned to maintain the protected title, which resulted in the creation of a new body, the Architects' Registration Board, the majority of whose members are lay people (Ball, 2009). Nonetheless, many architects question the value of the protected title in the context of the increasingly specialised division of labour (Ball, 2009; The Farrell Review Team, 2015).

In the 1970s, there was growing concern about the negative impact of the gap between the architectural and planning professions resulting in poor quality design of the built environment (Carmona, 1998). This led a number of professionals interested in promoting better interdisciplinary working to set up the Urban Design Group (UDG) in 1978. In the UK, it is the principal group that focuses on the subject and on its website it states 'The UDG believes that urban design is not the job of any single profession so we welcome members from a broad range of backgrounds' (The Urban Design Group, n.d). Like planning in an earlier period, the relationship of urban design to more established professions is contested. Schurch (1999) observes that some architects claim urban design as an extension of architecture and some planners see it as a branch of urban planning, whilst the significant contribution of landscape architects to its practice is not always acknowledged.

A number of publications have discussed the future of the planning and architectural professions. Planners have focussed on the contribution that planning can make to tackling social and environmental problems. The Town and Country Planning Association's '*The Future of Planning*' report highlighted the need for planners to show 'the transformational potential of planning to people's lives and well-being' (The Town and Country Planning Association, 2010, p. 10). Architects have highlighted the role of design in tackling contemporary problems and reviewed the changing market for their services. The RIBA Building Futures Group's report '*The Future for Architects*' (Jamieson, 2011) acknowledged that given the popularity of architectural degree courses in the UK means that many architectural graduates will need to seek employment outside conventional architectural practice. The report saw the future for the practice of architecture as a discrete business as

uncertain, but saw potential for architects to be part of multidisciplinary practices, which could offer clients a one-stop-shop service, and networked teams of smaller practices offering an integrated service.

Current practice and interdisciplinary working in the UK

The literature about the current practice of built environment professionals indicates a shift towards private sector employment, changes in the size of firms and a growth in multidisciplinary firms. The most recent comprehensive survey of built environment professional services in the UK was undertaken by the Construction Industry Council (2007). It indicated that whilst most firms were small, 84% employing fewer than 10 people, a small number of larger firms (2% of the total) generated 78% of UK fee income with the overseas market accounted for 15% of this total. 8% of firms offered a range of services and accounted for 49% of the total UK income.

Connaughton and Meikle (2013) in their study of UK construction professional service firms over the last 25 years highlighted the growth of larger, increasingly multidisciplinary practices. They identified the drivers of change being a decline in direct employment by the public sector, deregulation of the professions and public sector contractual requirements for compliance with policy such as health and safety and quality management. They categorised the largest 20 UK construction professional service firms in terms of their dominant discipline and found that, in 2011, ten were engineering led, three general surveying led, three quantity surveying led, one architect led and the remainder were either construction management or finance led. They noted that, between 1995 and 2011, these firms had more than doubled their staff numbers and had increased the diversity of their services and their geographical scope. These large firms have continued to increase their market share: Connaughton et al (2015) noted that the share of income revenue of the top five of the fifty largest firms in the sector had increased from 35.9% in 1997 to 46.2% in 2013.

In contrast to the post-war years, the majority of architects in the UK now work in private practice, with a tiny proportion of the profession employed by the public sector. Brindley (2013) reported that, in 2013, only one in three local authorities employed architects. Whilst a growing number of planners work in the private sector, a significant proportion continues to be employed by the public sector. The 2013 RTPI commissioned a survey of its members provides some insight on the nature of planning practice in England and Scotland, but as pointed out earlier only 25% of practitioners responded. 50% of all respondents worked in local government, whilst 22% worked for planning consultancies (5% of these for international, 9% for national and 8% for local consultancies) (Thurman, 2013). The remaining respondents worked for other employers such as development companies, agencies, universities, charities and architectural practices.

The RIBA membership survey of chartered practices provides a comprehensive overview of the nature architectural practices in the UK, as all practices are required to participate (Colander, 2013 and 2014). Brindley

(2013) presented a detailed analysis of the 2012/13 survey, which showed that the majority of practices (53%) were small with less than 10 members. However, large firms, employing more than 50 people, represented less than 5% of the total number of practices, accounted for 40% of employment (Col&er, 2014). Commentators noted the decline of middle sized practices, particularly since the economic recession in 2008 (Brindley, 2013; Hopkirk, 2013).

The RTPI's Directory of Planning Consultants, which is available on the RTPI's website, provides details of registered firms. The Directory is a service to which practices can subscribe and information is updated annually by the practices themselves. Our analysis of practices in the London Region included in the directory shows a concentration of small practice (with less than 10 members), which account for 39% of the total, and large practices (with more than 50 employees) accounting for 43% of the total.

The Urban Design Group Register (Urban Design Group, n.d.) is a key source of information on practice offering urban design services in the UK. Our analysis of the register (following Connaughton & Meikle, 2013) indicated that the majority of practices were architect led firms (34%); followed by planning led firms (18%); urban design led firms (18%); interdisciplinary/multidisciplinary firms (12%); landscape architecture led firms (10%) and other (8%).

Although interdisciplinary collaboration amongst built environment professions is widely advocated, there has been relatively little literature on interdisciplinary working in practice. Some of the professionals involved in teaching on the University of Cambridge's masters in Interdisciplinary Design for the Built Environment have reflected on their own practice. Price (2001), drawing on his own experience working as a structural engineer, described a range of different types of interdisciplinary collaboration. These included a project team involving different disciplines from different practices working in the same physical location on a large project, a large interdisciplinary practice organised into multidisciplinary teams and long-term partnership working between practices specialised in different disciplines. Price recognised the need of specialist knowledge and skills, but emphasised the importance of developing a common language for effective communication between experts from different fields. He concluded that, whilst there was not one ideal organisational model of collaborative working, the key ingredients were a desire to communicate and a passionate commitment to creating quality buildings. Ritchie (2001) stressed the importance of overcoming professional barriers between architects and engineers, arguing that the development of synthetic thinking required an attitude, which is no longer territorial. He identified the crucial ingredients of collaborative working as listening to others, respect for individual skills, establishing a communality of aims and the development of mutual trust.

The American architect Brause (2017) recently published *The Designer's Field Guide to Collaboration* based on her interviews with architects discussing their collaboration with other design professionals such as

landscape architects and engineers. She identifies some similar features of good practice to Price (2001) and Ritchie (2001) including good communication and respect for the skills of others. She also highlights the benefits of early design workshops to create shared visions for projects, giving and receiving constructive feedback, encouraging a culture of debate and challenge, working in close physical proximity to encourage a constant exchange of ideas, and collective reflection to build capacity to face future challenges.

Interviews with practitioners

The key primary research was a set of interviews carried out between May and September 2016. 24 interviews were conducted with professionals working in the London area (18 in private practice and 6 in public sector organisations) to investigate the nature of collaborative practice, and to further scope out opportunities for future engagement with the BA Designing Cities course. Interviews were initially set up with existing network contacts, particularly University of Westminster alumni. Further interviews were set up using a snowballing technique. The interviews were semi-structured and each interviewee was asked questions based on a standard schedule, which focussed on the themes identified in the literature review.

Interviews were conducted with architects, architect-planners, planners, landscape architects and transport planners working in a range of private sector practices varying in size and service offering. The majority of the interviewees in the private sector worked in multidisciplinary practices, but some interviewees worked in smaller practices, which had well established cross-disciplinary links with other practices. The practices to which the private sector interviewees worked were categorised based on Connaughton and Meikle's (2013) classification of professional consultancies: seven were architecture led, four planning led, two engineering led, three urban design led, one surveying led and one IT led. The majority of practices, 11 out of 18, were large with more than 50 members; but the sample included three medium sized practices employing with between 10 and 50 members and four small practices with less than 10 members.

Three of the architecture led firms interviewed had planning teams: two were created organically and one by a merger with an existing planning practice. In-house planning teams at each of these three firms offered a full range of planning services, including advice on planning applications and preparing master plans. All three of these firms were large and only took on work in the UK. The fourth architect led large practice presented themselves as architect-planners; 60% of their work included master planning and urban design, and 50% of all of their work was located outside of the UK.

The planning led firms interviewed were comparatively smaller than the architecture practices. They typically offered a range of planning services (from project conception to planning permission and all stages in-between). The majority also offered urban design services. In comparison with the

broader interdisciplinary service offered by other practice types, the planning led firms offered a relatively narrow range of services.

Two engineering led firms were interviewed. One was a very large international multidisciplinary practice of engineers, designers, planners and technical specialists offering a wide range of services in the built environment disciplines. The London office had a separate planning division and took on work both in the UK and abroad. The other was a large practice offering engineering, urban design and conservation services focusing mainly on the UK market. Some in-house planning services are located within its urban design and transport division, although much of the planning services were outsourced. Both of these firms had a very strong ethic of interdisciplinary working.

Three firms described themselves as urban design practices. Two had been established over 25 years ago and had played an important role in developing the agenda around urban design in the UK. The founders of both these practices were architect-planners. As well as urban design services, both were involved in developing regeneration strategies and stakeholder engagement, and one also provided planning advice. The third was a more recently formed small practice founded by someone whose original training was in architecture. This practice offers master planning, urban design and consultation services.

The IT led firm is a very large outsourcing company that provides a wide range of professional services. It is an international company with regional offices in the UK. The planning division, operates as a separate business within the larger organisation, but nonetheless aims to be part of a comprehensive one-stop-shop built environment service offered by the parent company.

Six interviews were conducted with architects, planners and architect-planners working in the public sector in the London area. The interviewees worked for three Local Authorities and two Development Corporations. The role of interviewees varied and included planning policy, place making/shaping and design quality.

Analysis of interviews

The issues discussed in the interviews included the benefits of collaborative working, work organisation, the ingredients to successful collaborative working and obstacles that needed to be overcome. All of the professionals interviewed stated that collaborative working with colleagues with different professional backgrounds was key to virtually all of their projects. The themes of best practice in collaborative working, which emerged from the analysis, relate to organisation, team building, communication and fostering a learning culture. The interviewees were also asked about how they saw the market for their services changing and the future of the professions.

There was a general consensus on the value of collaborative working. Better quality design was seen as the foremost benefit. An architect who led a place making team in a local authority, when asked about the benefits of collaborative working, replied:

'Better built environment, better planning policy and better design. We started winning awards because of our multidisciplinary and collaborative way of working and again that feeds back into the process ... We are getting a higher calibre of recruits, because people want to work here, and developers are appointing better architects. It raises the game on everything.'

A planner who was a partner of an architecture led multidisciplinary practice explained that:

'There is always a richer outcome, because there is quite a lot of debate and differences of opinion, which has its advantages and disadvantages. It is quite hard to manage but at the same time you are going to get a much better distilled set of arguments.'

Another key benefit was a smoother process and a more streamlined service. The head of the London planning division of a large multidisciplinary practice pointed out that:

'We can provide a one-stop-shop for clients if that's what they want.'

The head of the planning team at an architect led practice made a similar point explaining why the planning team had been set up:

'Schemes were going too far without getting the right planning advice, at the right stage.'

Most of the private sector practices involved in the research were organised in teams based on a particular discipline and operated a form of matrix management with multidisciplinary teams set up for particular projects. A few firms, particularly those with an urban design focus, had multidisciplinary teams. Similarly two place making teams in local authorities included staff from different disciplines. Some multidisciplinary project teams were made up exclusively of in-house staff, but others involved members of different practices. Many practices had developed long-term collaborative relationships with practices specialising in different disciplines. In some multidisciplinary practices, there was a policy of positively choosing to work with other practices as this widened their experience.

Early involvement of different disciplines was seen as an important factor by many. A planning director in an architect led multidisciplinary practice explained:

'The critical thing is really involving all the disciplines early in the process, and giving them the opportunity to understand the direction of travel and also for those disciplines to feed into the design'.

Good communication, particularly the ability to listen, was seen as crucial to building trust and to effective collaborative working. It requires learning to understand the language and priorities of different disciplines. The head of planning in architecture led practice explained that communication had improved over time and that she now was able to speak more in 'a design language'.

Developing mutual respect and building trust were widely seen as key ingredients in successful collaboration. The planning director of a large multidisciplinary practice elucidated:

‘A potential obstacle is where you have different disciplines who work to their own agenda and are not actually listening to what other people are saying. I think if you work up trust with other consultants and team members over a period of time you get used to working together.’

Many of the interviewees highlighted the importance of developing shared objectives. A partner in architecture led multidisciplinary practice commented that:

‘I think generally the design gets stronger the more specialist inputs you get, provided that there is a strong concept at the heart.’

A partner in another architecture led multidisciplinary practice described how on all their projects they developed ‘a strong narrative for change’. He explained that this was a reiterative process involving not just the consultants, but all the stakeholders including politicians and the local community.

Many interviewees highlighted the role that design workshops play in effective collaborative working. A transport planner in an engineering led practice described how his practice organised multidisciplinary workshops:

‘The face-to face interactive workshop at regular times throughout the project is usually a pretty successful way for mopping up a whole lot of issues and being able to resolve them rather than producing a plan then getting a lot of input when things are fixed. It is getting everyone in the room face-to-face with the current thinking on plans.’

He also explained that the practice involved clients in these workshops and that in a master planning project the client could be multi-headed as several different organisations often were providing funding.

Many of the interviewees stressed the advantages of working in close physical proximity with professionals from other disciplines. An architect-planner in an architect led practice explained:

‘Physical remoteness is a barrier to interdisciplinary working. There are lots of digital tools that we are using. We have video conferencing, but critical things need to be face-to-face because it needs to be fast, and electronic things can’t keep up with the reiteration and allow the decision to be made. You can share stuff about options (electronically), but when you actually want to say if it is A, B or C, it is easier to hammer that out in a shared room.’

A planner in a multidisciplinary practice commented:

‘Because we work at the same office there are opportunities to just sit down informally and bounce ideas off each other.’

Quite a few of the interviewees worked in practices which provided shared space for socialising as a way to promote more informal communication between staff. Some practices regularly provided lunch for staff and this created an opportunity to get to get know colleagues in other teams.

Many interviewees stressed the need to be open minded and flexible. An architect- planner in an urban design practice highlighted good practice as:

‘Having an open mind so that you can listen to other points of view ... not being wedded to having one way of doing things and not saying this is our only solution ... having the flexibility to test out options is really important ... perhaps thinking the unthinkable in terms of what if we did it this way.’

A planner in an architect led practice considered that:

'Key to successful collaboration is the ability to accommodate feedback and to be flexible and not afraid of trying a different approach.'

Whilst flexible thinking was recognised as important, interviews also highlighted the need to respect professional boundaries and be clear about the role of different team members. An architect-planner in an architect led practice commented:

'You need to have a team that have skills that are complementary so that people are not tripping over each other.'

The importance of the right input at the right time was widely emphasised. Whilst it was important to be clear about roles, in large projects these might need to change as the project evolved. A planner in an architecture led practice, whose work included master planning, building design and interior design, pointed out that a different type of leadership was needed as projects moved into different phases. He described how the leadership of a project for the expansion of an airport would shift from a partner who had skills in strategic thinking and analysis of economic impacts, to a different partner when it was time to prepare a planning application.

The importance given to the role of project management varied considerably amongst the interviewees. Sometimes this was a separate role within the team; sometimes the design lead took on this role. Whether teams included a dedicated project manager partly depended on the scale of the project, but was also the result of the culture of the practice. Some firms put more emphasis on the process of project management. A transport planner in a large multinational engineer led firm emphasised the priority that they give to project management:

'Another aspect of our practice is that we do a lot of project planning, so before the start of a project we plan out roles and responsibilities and who is doing what. The project manager will always be someone within the team. Our staff, when they reach that level, are all trained as project managers and accredited within the business.'

Many of practices had regular in-house seminars, where people shared knowledge on a particular topic and discussed projects. On some occasions, these seminars also involved external consultants with whom they regularly worked. The two engineering led practices put considerable emphasis on learning from project to project. One held charrettes every two to three weeks where a member of staff presented a project or discussed a technical issue. A transport engineer from this practice commented:

'It is quite a challenge for people. I have been through a couple where I have been challenged quite a lot. You end up in a different place and see the project differently.'

However, differences in the ways in which architects and planners discuss their work can initially be a barrier to learning across the practice. Project crits are a deeply embedded part of the culture of architectural schools, which continue in practice. A planner working in an architect led practice explained that planners could feel quite alienated and find the process was overly subjective, but over time in this practice they have gradually come to understand the skills that architects bring and their skills as planners have become valued by the architects.

A number of themes emerged around how the interviewees saw the market for their services changing and how their practices were positioning

themselves to be able to adapt to change. In some practices, staff were increasingly specialised. A partner of a large architecture led multidisciplinary practice explained that most of their projects involved mixed uses. They had architects who specialised in retail, commercial and residential projects, and having this mix of skills enabled them to respond flexibly if the market shifted, for example, from residentially led projects to commercially led projects. Other interviewees noted an increasing demand for specialist planning advice: in the past architects or surveyors would have given planning advice, but clients increasingly valued specialist advice. However, others highlighted that, particularly at a more senior level, there was an emphasis on more generic skills such as an understanding of governance issues. A transport planner in a large international multidisciplinary practice explained that:

'In the last 2-3 years we have definitely much more focus on cities. This is linked to city mayors becoming more prominent in the UK and around the world. Cities are drivers of development and the whole urbanisation process and more sustainable solutions. We have focussed our business more on cities than countries and try to work with city mayors as they have more power to change things.'

Most practices, as well as aiming to work on a mix of project types, aimed to have a mixed client base in order to be better able to respond to changing demand. For some, this means having a balance of domestic and international clients, whilst for others it means a balance of public and private sector clients. The referendum on the UK's membership of the European Union occurred during the period in which the interviews were being conducted. The initial view of the impact of the vote for Brexit was that it was having a mixed effect. As a result of the fall in the value of sterling, foreign investors were keen to invest, as their money would go further. Similarly, tourism related projects were seen as good investments. However, other sectors, such as high-end residential, were adversely affected and projects were being put on hold.

There were mixed views about the relevance of the professional bodies to practice. Whilst their role in education was widely recognised, there was concern that they were perpetuating a silo mentality. Quite a number of the interviewees expressed a frustration with the professional bodies for not adapting to the pace of change and not tackling the big issues. Some interviewees felt that they would have a more powerful voice if they were part of a broader built environment professional group. One architect-planner commented:

'It is critical that the professions get aligned and talk about the issues facing cities.'

Conclusions

This research indicates strong interest in interdisciplinary working amongst built environment professionals in the UK and illustrates how a range of professionals in the London area are practising interdisciplinary working. There was a strong consensus amongst the interviewees that collaborative interdisciplinary working produced better quality outcomes. Early involvement of all the disciplines was recognised as important to successful collaboration. Good communication skills, particularly listening skills, were seen as key to building trust and mutual respect, and to developing shared objectives.

Design workshops at an early stage of projects played an important role in developing shared visions. Face-to-face meetings were widely seen as crucial for exploring design options and co-location of professionals from different disciplines was seen as encouraging informal communication that facilitated more effective collaboration. Flexibility and the ability to respond to feedback were identified as key ingredients in achieving the best overall solutions. Whilst flexibility was recognised as important, the need to respect professional boundaries and to be clear about the role of team members was also highlighted. The features of successful collaborative working identified in this research strongly echo those found by Brause (2017) in her research on architects and collaborative working in the USA. These research findings show that the relevance of these features to a broader range of professional disciplines in a different national context.

The research included interviewees from a variety of practices in terms of lead discipline, size, sector and project focus. The research findings suggest that larger multidisciplinary practices are better able to realise the advantages of co-location of different professional disciplines and to encourage more effective collaborative interdisciplinary working by promoting a learning culture through shared workshops, seminars and training. However, it also noted that smaller practices can realise some of these benefits by sharing premises with professionals from other disciplines and by holding joint seminars and other events. Although few architects are now employed in the public sector in the UK, the research indicated that, in the authorities and agencies where they were employed, they were able to make a significant contribution to the quality of the built environment through collaboration with planning colleagues.

Whilst the professionals who participated in this research were committed to collaborative interdisciplinary working, it was clear that there remain obstacles to it becoming mainstream practice. There is still a tendency for professionals to work to the priorities of their own discipline and not to appreciate fully the benefits that closer working with professionals from other disciplines can bring. Some of those interviewed expressed frustration that the professional bodies of the different disciplines, as a result of focussing on protecting their members' interests, sometimes reinforced a silo mentality and failed to adequately address the bigger challenges facing society. These views support the case for closer cooperation between professional bodies advocated by the Edge (Morrell, 2015). Education was highlighted as having a crucial role to play in breaking down interdisciplinary boundaries, which will require professional bodies to be more flexible in how they approach the accreditation of courses for entry into their professions.

The research findings will make a significant contribution to the further development of our new degree course, BA Designing Cities, and help to give students the right knowledge and skills to ensure their future employability in interdisciplinary practices. The body of knowledge developed in the research will inform the content of many of the modules in the programme. The research will also encourage a deeper engagement with practitioners and help the course embed within a wider community of practice, which will in turn help students develop a pre-professional identity (as advocated by Jackson,

2016). The interviewees were enthusiastic about the focus of the course and many offered to be involved with the course in a range of ways, including giving lectures to students, hosting visits by students to their projects, acting as an external examiner, attending crits of student projects and offering work placements to students. A number of the interviewees have already given presentations to students on their work, which were really useful, as they gave students at the start of their studies some ideas about the kind of projects, which they might be able to work on later in their careers.

This research also makes a contribution to filling the gap in the literature on interdisciplinary working in practice. However, it was exploratory and small in scale, so there is therefore considerable potential for further research on the subject. Given that our degree programme is internationally focussed, research on collaborative architectural and planning interdisciplinary practice in other national contexts would be of particular interest.

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