TAKE THE RED PILL: A JOURNEY INTO THE RABBIT HOLE OF TEACHING INFORMED RESEARCH

DR CHARLIE SMITH

Liverpool John Moores University

Abstract

In one of the more well-known scenes in the film *The Matrix* the character Neo has to make a decision. He takes either a blue pill to return to the relative security of what he knows, or he takes a red pill to go on a journey into the depths of the unknown.

Griffiths (2004) identifies four models of research-teaching dialogue: research-led, research-orientated, research-informed and research-based. This paper focuses on the latter, and argues that this approach is most aligned with the creative and divergent processes of design studio learning. In a discussion that links the themes of participation and production, studio teaching and its associated creative processes are explored as the generator of research. Arguably the term research informed teaching implies that research leads teaching, and therefore the approach described in this paper is made distinct by subverting the traditional term in favour of teaching informed research.

Central to the teaching informed research approach are studio projects. They are the essential substance of the research methodology, and become the research data for analysis. The paper makes reference to two projects by the author that have adopted the teaching informed research method in the design studio – one undergraduate and one postgraduate – which have led to award-winning and international publications. Discussion about methodology and outcomes identifies some significant principles to consider – and lessons learnt – when designing teaching informed research projects, which are evaluated in depth. For example, a common thread linking both projects was constructing a brief for the students to explore contemporary issues in building-types that are currently facing contentious challenges. Also, in a divergent process – which lies at the essence of the design project – outcomes are unknowable, and the researcher must embrace and account for the fact that the project trajectories are unpredictable and unexpected. The morality of students conducting research for academics is also discussed; it is argued that the pedagogic integrity of each student's project is of primary significance, but that the value of the research outcomes often lies in comparative analysis of the collective body of work produced in the studio.

This paper will demonstrate that when structured in an appropriate way, such a journey into an unknown rabbit warren of unanticipated twists and turns, which is an inherent characteristic of this approach to the relationship between teaching and research, can result in rich outcomes. It also argues it is an approach most suited to the creative environment of the design studio.

Introduction

There is a complex, and oftentimes uneasy, relationship between teaching and research in higher education. This is frequently expressed as a tension between where academics' priorities should lie. For example, there is evidence to suggest that national research audits can isolate research from teaching (Jenkins et al. 2003), at both institutional and individual levels (DBI&S, 2015). It has also been argued that there is no simple functional relationship between quality of research and quality of teaching at a programme level, where teaching and research are often organised separately with limited thought given to how they might be linked (Jenkins, 2004).

What are the ways to unite teaching and research in Architecture programmes? The general view of the relationship between research and teaching is that the latter benefits through curriculum content being informed by research – even if it is conducted independently of the teaching – thus ensuring that content is progressive. Whilst this position is not necessarily being questioned here, Griffiths (2004) argues that research and teaching can relate to one another in a variety of ways – often influenced by the discipline context and field of inquiry – and the above scenario covers but one.

Architecture programmes – and indeed other creative disciplines – have been far from exemplary at exploring relationships between research and teaching, and identifying ways in which they can create a mutually symbiotic dialogue. This is both rather ironic and a tragic loss. Research and innovation are fundamental parts of studio design processes, but opportunities are being missed to capture these and formalise them as research outputs, which can be presented at conferences, published and returned to the Research Excellence Framework (REF). Furthermore, publications about project work produced in studios often focus on the projects themselves, as opposed to deeper meanings signified by the work in wider contexts of challenging research problems. This paper evaluates two case studies that demonstrate potential ways to integrate design studio teaching into research projects as a central part of the methodology, leading to publishable outputs beyond the field of architectural education.

Much has been written about the relationship – the nexus, as it is often called – between teaching and research in higher education (Brew and Boud, 1995; Hattie and Marsh, 1996; Robertson and Bond, 2001; Hattie and Marsh, 2004; Jenkins et al., 2003; Jenkins, 2004). There are conflicting views whether the relationship has a positive, neutral or detrimental impact on the quality of students' learning experience. This paper posits a radical idea: whilst some argue that staff research is an irrelevance or even an obstacle to improving teaching quality, can teaching and research be conjoined in ways that enrich the learning experience?

Defining Teaching Informed Research (TIR)

Griffiths (2004) has identified four models of research-teaching dialogue: research-led, research-orientated, research-informed and research-based. This paper focuses on research-based teaching which is defined as being, "*designed around inquiry-based activities, rather than on the acquisition of subject content*" and where, "*the scope for two-way interactions between research and teaching is deliberately exploited*" (ibid., p.722). The argument being put forward here is that this approach is the one most aligned with the creative and divergent processes of the design studio.

Arguably the term research informed teaching (RIT) implies that research comes before teaching, so as to inform content and ensure the curriculum is at the forefront of knowledge – a popular perception of the research-teaching nexus. However, in the methods described below it is studio teaching and the design processes associated with it that lead the research, and which dictate the paths that it follows. Therefore the approach is made distinct by subverting the traditional term in favour of teaching informed research (TIR).

Central to TIR in Architecture are studio projects. Every year in every programme a wealth of creative and inspiring project work is produced. Often these projects challenge and explore contemporary problems and issues, and propose a diverse range of innovative solutions. However – more often than not – after the End of Year Show these projects are catalogued and archived, and become nothing more.

In TIR these design projects provide material for research. Whilst the students will conduct their own investigations as an integral part of their conceptual thinking and design development, this is independent of the TIR processes that follow the projects' completion. They provide the medium for analysis and evaluation against wider concepts and issues, and it is here that the main TIR processes lie. Put another way, the students' projects are the research data. The following two case studies describe experiences of the approach, and are followed by discussion around the outcomes and lessons learnt about adopting this method of uniting teaching with research.

Case Study One – The Book Repository Project

In November 2013 a project was devised for NQF Level Six Architecture students to design a Book Repository. The brief was for the final project of an undergraduate course at a United Kingdom university – a 20-week design module. It was one of five different projects offered to the cohort of 52 students, and they were asked to choose which project they wished to work on, subject to an appropriate balance of numbers within each tutorial group. Following a democratic selection and allocation process the Book Repository project group was composed of 11 students.

An aim of the project was for creative designers who have grown up on this side of the digital revolution to explore the role of books, and of the buildings in which they are housed. The term library was deliberately avoided to encourage students to approach the project without prejudice to a particular tradition or typology. They were asked to consider: the nature of the book as an individual object, the book as a collection, the relationship between the reader and their book, and the nature of research (or searching). A site was suggested, although a number of students identified their own site during the course of the design process.

Following their completion it was clear that a number of the projects addressed a variety of issues facing contemporary library design and the role of library buildings in society. For example, despite being designed by so-called digital natives, physical books were highly significant in every project; recent research in the US (Gregory and Cox, 2015) has shown a significant – and unexpected – preference in students for books over digital media for the majority of different reading needs. However whilst real books were always present, in the majority of the students' projects they were an expression of a larger concept as much as for reading – such as their cultural symbolism, for example. In fact spatial explorations around the activity of reading were notably limited. Several projects explored the wider and more complex roles libraries play as an important civic space and place of social interchange within the public realm. As such, these projects reflected somewhat surprising research which revealed that the majority of library visitors do not go there to borrow or return books (Aabo and Audunson, 2012). It has been argued that libraries are undergoing a renaissance (Hvenegaard Rasmussen and Jochumsen, 2009) as this traditional building type is re-invented for contemporary and future cultural exchange, and it is this re-imagination that the students' projects explored in depth.
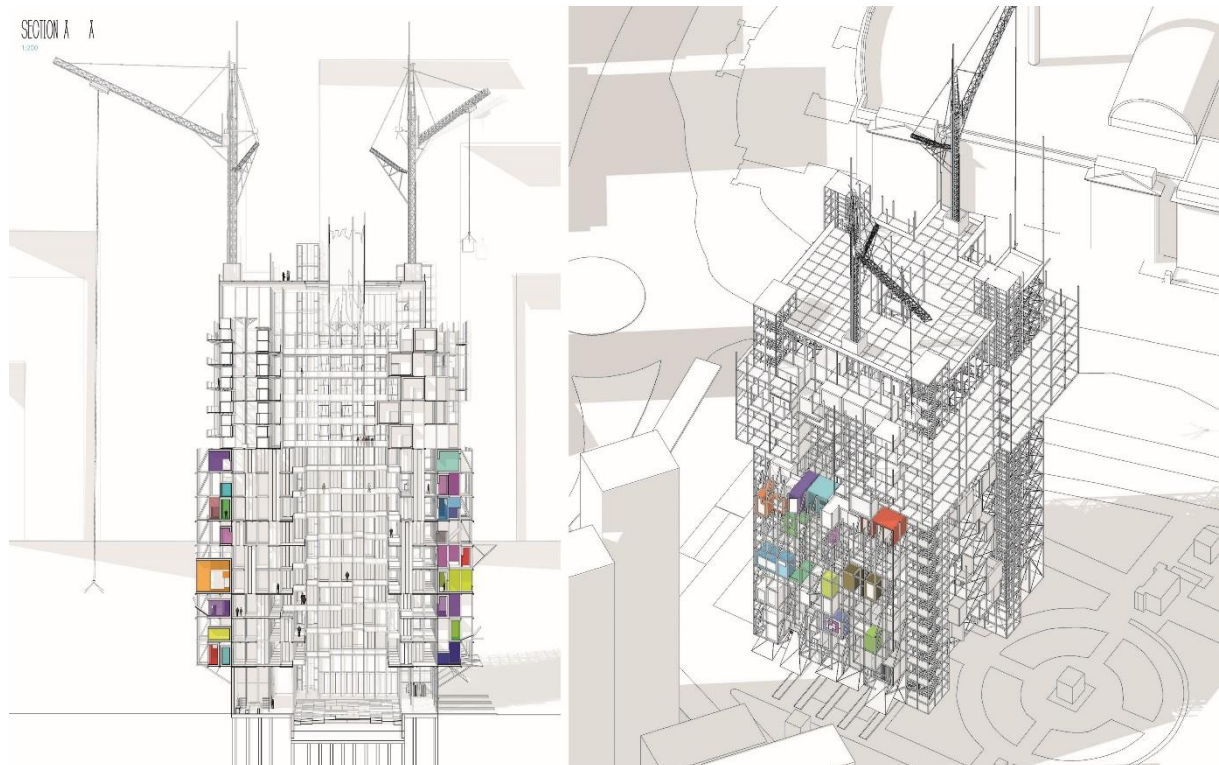
Figure 1. Section and axonometric. The changing permeability of this dynamic structure expresses increasing accessibility to the books within, which in turn is representative of the evolving democracy of knowledge. By Sarah Aziz.

During the summer after the projects were completed a research paper was written about the changing roles of physical books and library spaces, discussing their place in the civic realm in the context of increasing digitisation and cultural diversity (Smith, 2014). The discourse was structured around the students' projects as the central narrative thread, with issues they illustrated referenced to existing research on contemporary library design identified by the literature review. A key aspect of the overall body of work the students produced was its sheer diversity; the projects ranged from a place for storytelling to a place for writing, a third place, a meteorological observatory, a book museum and an archive. Such a multiplicity of responses highlights an intrinsic quality of the TIR approach. As a divergent process, design projects evolve in a wide variety of trajectories. For the researcher – like Neo taking the red pill in *The Matrix* – what lies ahead is unknowable. However, this turned out to be a very positive quality, as the paper was able to illustrate a variety of different key themes and issues. Had all the projects been very similar, that discussion would have been much less rich. This demonstrates how the inherently divergent nature of studio design projects is a strength in the TIR method.
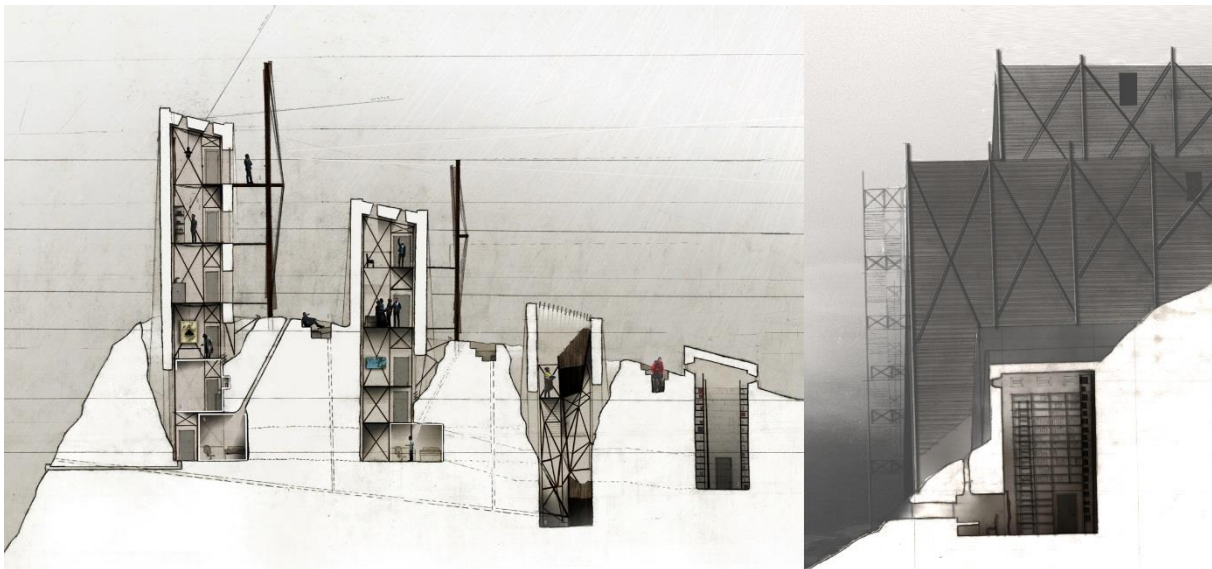

Figure 2. These sections through the meteorological observatory and archive show how the protective walls of the building are embedded into the mountain landscape – the smallest of which is the archive itself. By Alex Bodman.

An interesting aspect of the paper was that the tutor had no ambition to create a research output when setting the brief. That idea came after the project submissions when, reflecting back on the body of work that had been created by the students, its pertinence to contemporary issues in library design became clear to the tutor. As Schön (1983) highlights, design is not simply a matter of solving problems but also of finding out what the problems actually are. As opposed to submitting the paper to a journal about architectural education, it was submitted to *New Library World* – an established practitioner journal specialising on the changing role of the library and the impact external factors have on its future role and development. It went on to win Outstanding Paper in the 2015 Emerald Literati Awards, and led to the author being invited to write a book chapter on the future of libraries in the digital era, which also utilised student projects in the narrative (Smith, 2016). This clearly demonstrates the esteem which research based around students' project work can achieve.

Case Study Two – The Terraced Housing Project

A raft of challenges face new housing design, at the forefront of which is a triumvirate of interrelated needs: to make dwellings more spacious, more affordable and less damaging to the environment. Each of these is important in their own right, but are they reconcilable? Conventional thinking suggests larger dwellings cost more, as does increasing their environmental sustainability, so consequently they become less affordable.

In March 2015 Architecture students studying the NQF Level 7-1 MArch programme at the same university were set a project to design housing for sites in Liverpool. The module lasted for six weeks during the second semester.   Students were asked to select one of three typical UK housing types – an urban block, terraced, or detached / semi-detached – again subject to an appropriate balance of numbers within each tutorial group. Following another democratic allocation process the Terraced Housing project group was composed of 14 students. They were given a site in the Georgian quarter of Liverpool, not far from the city centre, and were challenged to explore the potential of the terrace typology for housing suited to contemporary forms of living, and which examined the interrelated priorities of space, affordability and environmental sustainability.

In the summer following submission of the projects, when the pressures of teaching and assessment had subsided, a comparative analysis of the projects enabled common themes and design strategies to be identified. For example, rather than just considering space standards quantitatively numerous students explored it as a qualitative concept, which led to thinking beyond conventional dwelling spaces and questioning what modern patterns of living actually demand.
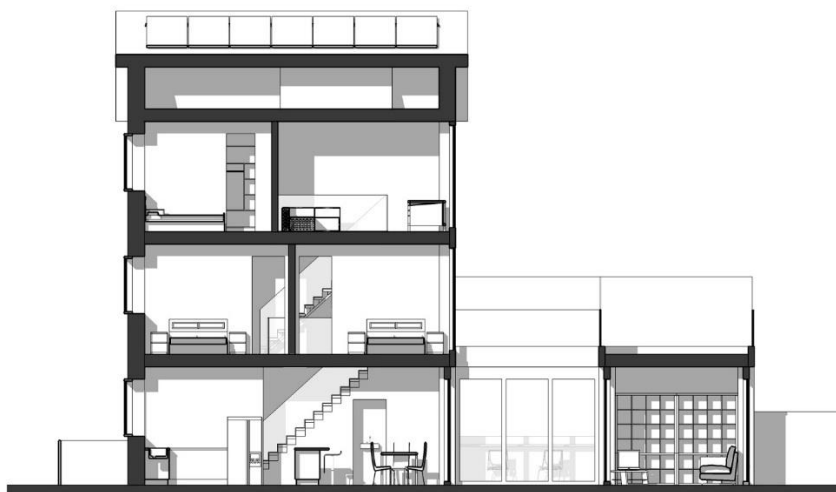
Figure 3. Plan, isometric and section. In addition to providing different configurations of the internal layout this project also provided the option of additional space for extended family members to live with a degree of independence or a home office. By Omar Shariff.

Some commonalities emerged, such as providing dedicated spaces to enable adult offspring (unable to afford their own dwelling) or elderly relatives to live as part of an extended family. As such, the family unit became a plastic concept which the students perceived as flexing and changing significantly over time. Some students proposed multiple living rooms so that occupants could relax in different ways at the same time – suggesting the notion of the whole family gathering around one television is an outdated one. Other projects proposed dwellings incorporating sliding or folding screens so that rooms could be easily reconfigured throughout the day – subdivided when different activities had conflicting needs and then recombined to create an open plan. The RIBA (2011) have argued for more research into what constitutes adequate space to suit contemporary living patterns; taken collectively these projects make some suggestions toward that understanding. Lack of natural light is a significant cause of dissatisfaction with new housing in the UK (Ipsos MORI, 2013); a number of projects addressed this, and in some instances courtyards or skylights and light wells were included as well as large windows.

Figure 4. Site plan, section and perspectives. This project proposes two different house shells containing a staircase, kitchen and bathroom. Beyond these, it is up to the end-user how space is tailored to the needs of its inhabitants. This concept was explored by applying three different scenarios to each of the shells and examining how those family types could appropriate the space. By Matthew Kerrod.

In the first instance the project work was presented by the tutor at an international conference on housing, which showed the students' work at a formative stage partway through the module. The author was invited to develop that initial paper into a book chapter, discussing the apparently conflicting issues of space, affordability and environmental sustainability in new housing in the UK, and arguing that by using advances in each separate area to mutual advantage it is possible to reconcile them (Smith, 2015). Whereas the Book Repository paper used the students' projects as the central thread of the narrative running throughout, here the projects were discussed in one section within the chapter, using them to illustrate potential solutions to the numerous challenges that currently face new-build housing across the UK, and highlight potential trends and new ideas.

Some Lessons Learnt About TIR
A fundamental quality common to the Book Repository and Terraced Housing projects was that as theoretical constructs the students were permitted a high degree of intellectual and creative freedom. Consequently their designs could push boundaries in exploring what libraries and housing could be. Doevendans et al. (2002) discuss three types of research: questioning-prescriptive, questioning-descriptive and research of the imagination; TIR clearly lies in the latter category. This is a highly positive quality to using studio design projects as research methodology – they can explore deeply hypothetical concepts.

Griffiths (2004) argues that research in applied fields – common to built environment subjects, including architecture – is about bringing new approaches to intractable problems and conflicts in the field, and not towards knowledge and understanding for their own sake. The implication of this for the TIR approach is that studio projects must align with such problems and conflicts. Another commonality between the Book Repository and Terraced Housing projects was a brief to explore issues in building types that are currently facing contentious challenges. Therefore, to adopt the TIR approach project briefs should not be esoteric or abstract, or generate self-fulfilling prophesies, but respond to – and be interrogated against – challenges in real-world scenarios. Writing briefs that align with contemporary problems and conflicts also strengthens the potential impact of the research, and creates wider scope for dissemination in discipline specific journals as well as those in the field of architectural design and education. Setting briefs that challenge real-world problems may be disconcerting for some teachers, as it might be thought that reality could inhibit creativity in the design process. This suggests that such projects are more suited to cohorts in higher levels, as they are better able to reconcile creative exploration within imposed parameters.

One of the key aspects that makes TIR distinct from other approaches to the research-teaching nexus is the sequencing of the project work within the research methodology. In TIR the projects take place immediately after the research question – the brief – is set. All other stages – including the literature review and analysis – follow because these are all directed by how the project work evolves, and where it leads to.

The case studies described above both followed similar sequences in terms of research process. Preliminary research was conducted to establish the context for the design brief – a standard part of setting any project. The brief was then issued to the students and the projects followed the normal journey of development for the duration of the module. Once submitted the overall body of project work was comparatively analysed to identify themes and trends. Next a literature review was conducted by the tutor to facilitate a deeper level of understanding of particularities raised by the projects. This review identified existing research about salient issues in the field of inquiry to contextualise the projects; in both case studies this covered critical issues in design, theory and policy pertaining to the building type specified by the brief.

The research output was then written using the projects to illustrate issues, drawing on the literature review to validate these. The Terrace Housing project differed slightly because the conference where the work was presented at a formative stage took place whilst the projects were running; therefore the tutor conducted the initial literature review in parallel with the projects, which had the benefit of informing the studio work as it progressed. The comparative analysis of the

projects then took place following their submission, and a further literature review was undertaken before the chapter was completed.

Because the majority of the research processes in TIR usually take place after the students' project work is completed, a potential shortcoming is that the research cannot feed into – and therefore inform – those projects. It is often argued that the benefit of research informed teaching lies in its enhancement of curriculum content, thereby deepening students' learning. However if the project brief is refined in response to the TIR outcomes, then they become part of the foundations for subsequent cohorts to progress their projects from. This creates a developmental cycle to the TIR method in which each cohort can spring from the previous one. However, this does require continuity – as opposed to reinvention – of project briefs from year to year.

Although a number of students designing Terraced Housing explored increasing affordability through both advanced housing manufacture and reducing utility bills, a shortcoming was that there was no robust method for these strategies to be costed. This highlights the need for an appropriate evaluative framework through which to critically appraise the projects. In the case of the Book Repository this was achieved through the literature review, which followed completion of the projects when the idea for a paper first came about. Existing research on issues raised by the students' work was explored, and the validity of the projects in the context of those issues then established.

Questions may be raised over the ethics of students' work being used as part of tutors' research. Is it appropriate that projects produced by students are subsequently used as material for staff conference presentations and publications? The students' projects are being produced anyway, but what are the implications if they are then used as material for research?

When briefs are being written, it should go without saying that the primary objective is alignment with the module's Learning Outcomes and any validation Attributes or Criteria that are mapped to it. Then the pedagogic depth and creative potential of the brief should be established, ensuring that strong students will be sufficiently challenged whilst those less capable have sufficiently defined parameters to work within. The relationship to a particular tutor's research field should only then be drawn. Put simply, the learning experiences of the project precede any consideration of a research idea. Equally, the students' exploration and final resolution of their project must be the primary focus and outcome; should their work diverge from any preconceived research objective this must be embraced and encouraged. In fact – as demonstrated above – the more diverse the projects produced, the more expansive the comparative analysis in the context of problems and conflicts will be.

If there is no increased demand placed on students beyond completing project work in accordance with the requirements of the module, arguably they benefit from having their work included in research outputs. Whether an international conference presentation or peer-reviewed journal publication, these can be included on students' CVs, blogs and websites, thus providing means to promote their design work. By following these principles the TIR method will not fall foul of accusations of students doing a tutor's research for their behalf. Another risk may lie in a belief by students that they have been set a particular project to satisfy the idiosyncratic research interests of their tutor. However, if students select which project they design in a module – as in both the case studies discussed above – should any brief not appeal to them then they simply avoid proposing it as one of their preferred options.

It should also be self-evident that students' permission must be sought before publishing their work, and that they should be acknowledged in presentations and publications. Interestingly, the author has never been denied permission to use students' project work in a research publication, even by students who have graduated and therefore are not subject to any influence of the student-tutor power dynamic. In fact, some have commented on the interest they have in seeing the tutor's interpretation of their work when it is discussed in a wider context of the research question.

Conclusions

Every year in every Architecture programme a wealth of creative, innovative and inspiring project work is produced. Should more of this be captured in research outputs which extend beyond publications on architectural education? There is much debate over the relationship between teaching and research, and how they impact on each other; that relationship can be significantly affected by the pedagogic methods of a programme (Robertson and Bond, 2001). As Brew and Boud (1995) highlight, the nature and quality of the co-relationship between teaching and research will have significant impact on the degree of productive symbiosis. Arguably studio teaching – with inquiry-based learning and one-to-one tutorials – is highly suited to fostering close links between the two, and studio projects have much to contribute to discourse on a wide range of contemporary problems.

The experience taken from running the two TIR projects described above has highlighted some key issues to consider when adopting a similar approach. Firstly, project briefs should be set to explore contemporary problems and conflicts in building types, or the equivalent, which are currently facing contentious challenges. This creates a relevant field for the research to contribute to. Secondly, the majority of the literature review and all of the analysis generally follows completion of the project work by the students, to explore in more depth particularities revealed by the work.

Finally, there needs to be an appropriate evaluative framework for the project work – the research data. For example, this could be comparative analysis, contextualised against issues relating to theory, design or policy in the field of inquiry as identified through the literature review. However, where that field extends beyond the tutor-researcher's expertise, such as detailed cost appraisals or the appropriation of new technologies, then collaborations may need to be sought in order to robustly appraise the project work.

Interestingly, in debate over the relationship between teaching and research there are very few arguments that teaching effectiveness makes for better research – a causal link is, almost without exception, sought the other way round (Brew and Boud, 1995; Hattie and Marsh, 1996). In sharp contrast the TIR approach, in which research emerges from the outcomes of teaching, creates a very persuasive case for placing excellence in studio teaching at the epicentre of creating good research. Furthermore, when a cyclical developmental process is created year on year, research findings and outputs from TIR can inform and enrich the learning of subsequent cohorts.

Like research, learning is also about formulating knowledge. In the approaches described in the case studies, research develops from the students' project work, which is the product of the design process. Although beyond the scope of this paper, there is a strong case to be made for research outputs arising from of the creative processes that students engage with during the development of their projects, which would equally fall under the conception proposed here of research being informed by teaching. Either way, when teaching leads research the path will be an unknown rabbit warren of unanticipated twists and turns. However, as an inherent characteristic of the TIR methodology this can result in rich outcomes that relate studio teaching to much wider contexts, and lead studio project work into diverse fields of research.

Acknowledgements

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