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Architecture Live Projects - managing emergent ambiguities in risk management and ambiguity tolerance.

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ABSTRACT This paper examines one of three key findings from a recently completed PhD enquiry entitled, *Architecture Live Projects: acquiring and applying missing practice-ready skills.*[1] Through a mixed methods approach that consolidated evidence from outside as well as inside architecture and academia, the thesis examined to what extent Live Projects enable students to gain risk management & ambiguity tolerance capabilities. This paper principally considers why these skills are important to today's graduating architecture students and how they might acquire them. By asking respondents about their experiences of exposure to, or experience of, risk management and ambiguity tolerance, the study also identified what risk was perceived to be in architecture education and practice.

KEYWORDS pedagogy, risk management, ambiguity tolerance, architectural education, live projects

There is increasing evidence that learning risk management and ambiguity tolerance can help graduates lead more successful professional lives.[2] Consequently, the acquisition of these skills has become a priority shared by higher education institutions in general, not just schools of architecture. Exposure to risk, litigation and uncertainty are established hazards of the trade in the practice of architecture.[3] That architecture practice is becoming an increasingly 'risky' environment in which to operate places pressure upon architectural curricula to respond.[4] Risk in architectural practice is broad-ranging in scope, encompassing issues from litigation and indemnity to a more general uncertainty about the direction of the profession in relation to role, structure and even purpose.[5] Up-skilling architecture students in both risk management & ambiguity tolerance could therefore be seen as directly responsive to an industry-based impetus.

Furthermore, not all risk is bad. In fact, what makes risk ambiguous to begin with is the difference between 'good risks', such as creative or entrepreneurial behaviours or 'bad risk', such as health and safety complacency. However, as the respondents later identify, what risk means is more nuanced than these binary examples. In order for authentic risk taking to occur, logically, students need to take actions in ambiguous or uncertain circumstances. Ambiguity tolerance therefore involves being able to differentiate between good and bad risk taking behaviours. This is why these skills need to be considered in relation to each other, rather than in isolation.

Concerned educators might reasonably seek to consider how to better facilitate the acquisition of these specific skills. Limited pedagogic literature identified that setting assignments that require students to take risks or cope with ambiguity can help them acquire skills that will prove useful in professional practice.[6] Yet designing assignment or performance criteria that simultaneously engender ambiguity whilst at the same time ensuring fairness, transparency and validity, can prove elusive Although setting a learning outcome of 'an ability to deal with ambiguity' could be perfectly reasonable, it could also be unreasonable if other expected outcomes are jeopardised by the ambiguities that students encounter.

As the differences between architecture schools best illustrate, the RIBA curricula can be implemented via different pedagogic models. Operating beyond Design Studio and lecture hall situated learning, the model chosen for study was Live Projects – a 'form of proto-practice'[7], involving a negotiated, 'brief, timescale, budget and product between a client and an educational institution'[8] which the literature identifies as offering learning experiences that more closely align with the risks taken in professional practice – for example, team-working, client collaboration and building site activity, even with a modest scale structure. Whilst risk taking does occur in other forms of architectural learning – for example, in Design Studio, where students take creative risks with medium and form – this paper and host PhD focussed exclusively on upon the extent to which students gained risk-taking skills and behaviours specifically within Live Projects. In order to do this, the difficulties and benefits of exposing students to both good and bad risks and the importance of understanding this distinction are also examined.

Research methods & analysis overview

The enquiry employed qualitative as well as quantitative data collection methods – mixing interviews with online questionnaires. The perceptions of educators, architects and students through the thematic analysis of the interview transcripts and also real world, action-based research, which focused upon problem solving with a view to creating meaningful change. The mixed methods approach permitted triangulation of the data.[9] The emergent themes relating to the acquisition of risk management and ambiguity tolerance skills were then inter-related to highlight any interdependencies and to ensure a rigorous level of analysis and abstraction. Mixed method or 'multi-method' analysis [10] - involving a series of matrices - was used to compare both quantitative and (selected sections of) qualitative data. An extended and iterative period of data gathering and analysis allowed the researcher to consolidate observations regarding the acquisition of specific skills in both an academic as well as a practice context to consolidate into a concise set of learning concepts. The thesis subsequently used these learning concepts to define tentative assessment rudiments. The samples were drawn from 187 UK & US based

respondents, located within both practice and education: encompassing architects, trainee architects, students and educators both with and without Live Project experience, to enable a clear set of variables for comparative analysis.

Risk, ambiguity and failure

Risk-taking can require the ability to cope with failure, not just achieving success. But should the failure to achieve a specific outcome mean that the process and an alternative outcome are classed as invalid? What happens when the failed outcome is the better outcome? Within the commercial sector, 'failing' is a behaviour often considered to be a requisite right of passage to achieve innovation – a desirable behaviour whose benefits are considered in more detail in later sections of this paper.[11] The view that a failed experience is a valuable one was echoed by a number of the respondents.

As one student explained, Live Projects allow them to, "loose [sic] bad ideas by testing them." Or in the words of an educator, "failure is a part of practice. Courses should therefore provide failure training." When 'bad ideas' are tested and go wrong the consequences can be far more serious. What an academic environment offers a Live Project student is the forum within which to reflect, analyse and contextualise the different risk taking experiences that the Live Project offered. This is something that the pace and pressures of practice would not accommodate as easily.

But it's not just a question of ensuring students acquire industry-relevant skills. There is a body of learning theory that evidences how failure can facilitate better learning.[12] According to one student, "you learn so much from failing. It forces us to make strategic assumptions that are then questioned, so we need to be really considered and deliberate." Generally therefore, respondents identified that failures were considered to be a rite of passage, or as one student described it, 'a learning opportunity - rather than just getting printed feedback from the professors.' This suggests that live participation in a failed outcome could be the more effective educational experience than the production of a retrospective, third party (tutor produced) written summary. The level of understanding and 'risk' expertise as well as 'creative maturity' captured here prompts the question of how a scenario exercise based on fictional circumstances set within a lecture hall or Design Studio would elicit the same evidence of learning? Not all Live Projects are 'risky' by default. However, they provide a greater range of opportunities for risk management to occur. These range from the client/team relations to physical risks associated with building sites and weather exposure. However the extent to which students' are exposed to opportunities to exercise good and bad risk decisions, still requires educator mediation. For example, allowing students to wear flip-flops on site in order to make them learn about health and safety at the point when an injury occurs would be a serious breach of an educator's duty of care.[13]

Learning about risk involves exposure to the kind of risks and potential failure that can impact upon peoples' lives and not just material outputs. As one educator described it, "Live Projects assess students' ability to manage failure, not just the design outcomes." Furthermore, it's not the students' willingness to embrace failure - not least because incentivising students to fail would be irresponsible and potentially devastating for the participating communities - but the way in which students manage failure when it occurs.

For example, as one educator noted, "students often correct their failures in the field," or as another put it, "students fail, undo, try again." The student respondents shared similar views. As one student explained, "we failed to adequately assess the risks we were taking autonomously within the project [and] learned from failure." The acknowledgement that failure has resulted in learning has to some extent answered the question posed by one educator as to whether, "failure [can] be successful." It is worth noting the influence of the educator's perspective in encouraging students to view 'failures' as strategic rather than disastrous is likely to play a significant role in enabling students' ability to find solutions and achieve meaningful learning from things that go wrong.

Finally, one of the biggest challenges associated with allowing or even soliciting opportunities for 'failure' within Design Studio or Live Projects is the potential difficulty in how it might then be assessed - in other words, what 'successful failure' might look like. For

one, failing to complete a Live Project might jeopardise the ability of the students to achieve other skillset behaviours or learning outcomes, but secondly, what if there is no failure? If everything goes well, having 'managing failure' as an assessed learning outcome may not be fair. The latter issue may well be an argument for doing this better in a controlled, fictional, Design Studio setting.

Of the 187 respondents to the online questionnaire, 50% agreed and 20% strongly agreed with the statement, 'Professional Practice increasingly demands that architects have greater risk management capabilities,' or as one of the respondents explained, "I would like to add that most architects I have worked with approach the practice of architecture from a standpoint of fear and liability...fear about going too far out on a limb with a radical design when an ordinary design will suffice and liability in that they simply do not want to be sued for errors and omissions or other mistakes on the job."

Risk and ambiguity within a changing profession

The on-going economic crisis combined with historical problems regarding the professional remit of the role of the architect (for example, the rise of the consultant designer) has resulted in increased levels of ambiguity in professional practice. This suggests that architecture practice is increasingly concerned with not only finding the right answers but also about framing the right questions. Although ambiguity in practice was previously discussed in relation to finance, not all respondents felt that this was the biggest issue, with one architect identifying that, "The biggest challenges facing the architecture profession are fees not increasing.[14] The traditional model of an architect must change." Other respondents identified the way in which the public were uncertain about the role and priorities of today's architect and one identified that, "The profession of architecture has in the last ten years focused on being formulaic, very entertaining - frivolous almost. It's a clown show. Only the 'starchitects' get the attention - 1% in essence - so this gives a false perception. In reality, most architects are interested in civic responsibility."

But if changes in practice are taking place at speed and on a grand scale, how is it possible to set a relevant curriculum in architecture schools? If, "students are looking for practice ready skills… beyond university taught skills [that] feed into future practice," Yet perhaps it is when professional practice becomes less stable that educators have an opportunity to influence the potential direction of the profession. One route is to give students the opportunity to acquire skills that are overlooked by the validating RIBA curricula. Whereas the U.S. specific NAAB (National Architectural Accreditation Board)[15] Criteria fails to even pay passing mention of risk tolerance or ambiguity management skills, in contrast, the RIBA criteria mentions the need for risk 'understanding' in relation to 'practice management' 'cost' and 'quality.'[16] Yet as this study identifies, how risk is interpreted and understood by respondents is not only more nuanced, but at times associated with the professions unstable and changing conditions. Yet if, "Live Projects can create more elaborate alternatives in practice," then surely we have an opportunity to set learning activities that enable students to experiment with potentially more viable options for future practice? Of course, there is a possibility that some educators, wrapped in the "duvet of the academy" might not agree with the scale and significance of the change needed to meet this remit. However, what is interesting is how inclined the students seem to be towards risk taking. As one student explained, "The world of design is changing for architects, we have to adapt to new things."

Given one of the major criticisms of architectural education is its detachment from practice,[17] observing students' awareness of the pressures facing practice suggests that Live Projects' reflective-of-practice characteristics might go some way to addressing this. In order to consider this more carefully, it is important to look at how the profession is changing and in what ways.

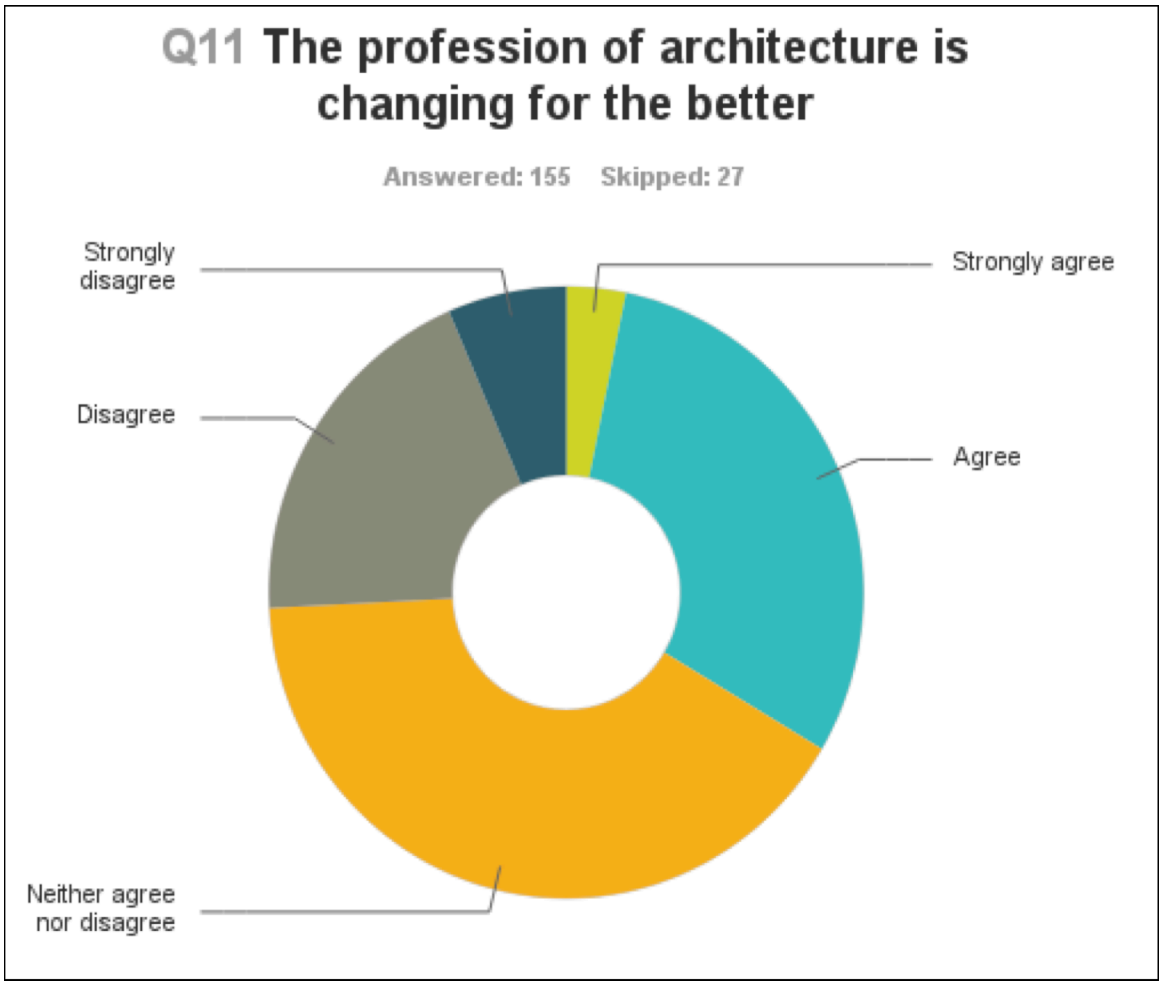

Figure 1, from Harriss, H., (2015)

Change and frustration

One of the surprising discoveries within the data was the level of frustration respondents expressed about the profession. In looking at the source or origins of this frustration, the enquiry examined the implications for schools. To elicit more poignant insight, a deliberately provocative question was asked. In the online questionnaire, respondents to agree or disagree with the statement, 'the profession of architecture is changing for the better.' One third of respondents agreed with this statement, which could be interpreted as either high tolerances to change or the ability to see it as a positive opportunity. Another third of respondents neither agreed nor disagreed, whereas the remaining third either disagreed or strongly disagreed, which indicates a reasonably balanced polarity amongst respondents. However, the comments section of the online questionnaire revealed the perils of making over-simplified assumptions. For example, respondents who did not view change as positive couldn't necessarily be considered less able to deal with change. Instead, there was evidence that suggested how many felt the profession was not changing fast or enough, or not in the right way. As one architect explained, "whilst the world has changed, architecture has largely remained the same". A student also pointed out, "I am surprised that no architectural school at the present time is changing or improving the architectural education like Bauhaus did! So, is that a good sign? " This student was not alone in thinking that the school could do more to respond to or lead change. Yet as one respondent contended, "schools of architecture wish to remain the same," an antipathy that was mirrored elsewhere within the data. The frustration that schools fail to offer anything leaning towards a reimagining of the 'radical pedagogy'[18] encapsulated in the Bauhaus School, to some extent affirms that there is a perceived lack of differentiation between schools.

Overall, the broad consensus amongst respondents, however, was that change was indeed taking place, even if this change was

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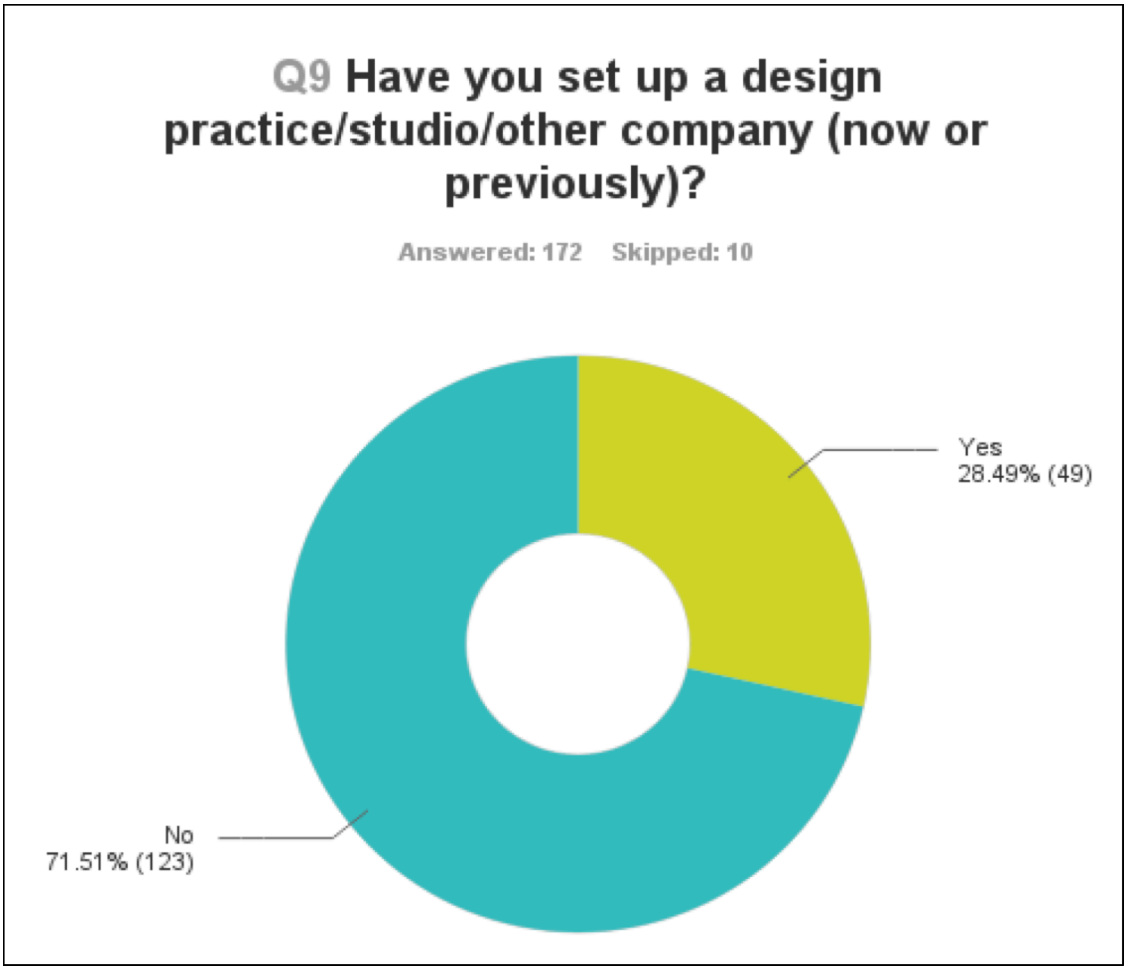

Figure 2: Harriss, H., (2015) Online questionnaire

good, bad or insufficient. Whilst some of the respondents felt threatened by change - identifying a 'dilution' of identity and a sense of being "undervalued," as well as, "far greater levels of risk," - in general, others felt this 'dilution' indicated a shift in disciplines that could be considered as an opportunity. For one such respondent, "the boundaries are blurring so the conventional profession of being an 'Architect' may not be getting better but practicing architecture is." Another felt that the impending scale of change could redefine architecture completely. As they saw it, "the discipline of architecture is on its way out, refusing to change with the tides."

Emergent entrepreneurship and innovation

During many of the discussions about risk taking, it was noted that respondents frequently described behaviours that are often outside of the conventional definition of an architects' role. As one educator explained, "Risk and innovation have a reciprocal relationship" whereas another explained that, "risk is embedded in all design activity - that's what fosters innovation." Of the 187 respondents to the online questionnaire, 52% agreed and 41% strongly agreed with the statement that, 'Learning how to take 'good' risks - innovative, experimental, entrepreneurial activities - is essential in today's architecture practice environment.' As one respondent added, "If architecture as a profession is to get out of its current malaise, it will need to be more innovative and entrepreneurial," but added that, "this will not be handed down from the existing professional structures." A view that was shared with another respondent who stated that, "It should be essential, but it isn't at all the way architects currently practice." It is also worth noting that of the 187 online questionnaire respondents, 29% had set up a design practice. Therefore many of the respondents appeared to be involved in entrepreneurial activities, which may ultimately account for their apparent receptivity to risk.

So if the term 'entrepreneurship' is absent from the RIBA criteria, and the NAAB has only just adopted it in their 2013 criteria[19] where does this leave schools of architecture in terms of offering learning experiences that facilitate entrepreneurial behaviours? Indeed, one US educator - interviewed before this change to the NAAB criteria came in - had already observed how, "the parameters of design education are diversifying to include more business management content." It will therefore be interesting to observe how long before this change is adopted in the UK criteria too. And yet, the RIBA criteria refer to 'innovation' albeit in relation to design work.[20] But why this might be problematic is reflected in the insights of one respondent who explained that, "we live in a world where innovation is so ubiquitous and that the rewards are obvious and clear to all. I think this attitude is hugely different from the position of say the 1980s where the opposite was largely true." Therefore, the fact that the RIBA criteria recognises 'innovation' in terms of design and not other more ubiquitous forms of innovation, suggests failure of the criteria to reflect and reward current behaviours and priorities. This sentiment was echoed by other respondents who pinpointed this issue as a gap between the realities of practice and perhaps most importantly, how risk taking and innovation are part of the same skill set. "Most architects have a bit of good risk taking expertise because student studies encourage innovation and risk taking with design (although this might depend on the school) but actually schools don't teach skills of how to implement risky and innovative ideas in the real world." It was also noted that, "Enabling students to become 'better' risk takers…we can only hope students will be more entrepreneurial, but this is as much dictated by the market they are graduating into than anything else."

Finally, it was generally observed that students assume a positive approach to risk in Live Projects and rather than feeling deterred, a fact which concurs with recent literature. As one student explained, risk is, "something that we have to get used to - in the 'real' world, real people are involved in making decisions and real people along with their situations will be affected by these decisions."

Teaching risk & ambiguity: the responsibility of the school

As outlined previously, students' ability to manage risk and ambiguity within Live Projects is evidenced by the tactics they use to adapt to a situation and even to turn it to their advantage. Examples of this included creating and imposing deadlines on team-workers and clients, overcoming complexity and in general, "finding solutions when things seem impossible."

So how does this compare with the established model of architectural education? After all, it is not just the world of practice that increasingly demands that students have these skills and many students want a more diversified higher education experience.[21] Within the online questionnaire, 76% of respondents agreed with the statement that, "architecture students should be taught to anticipate an uncertain professional future." This raises significant questions about whether schools are achieving this at the moment. As architecture students grapple with the remit of their role and the potential to shift it, educators are similarly grappling with the idea of setting learning exercises that have ambiguity built in. For some of the respondents, the idea of teaching students about 'uncertainty' seemed a 'negative' thing to do: "This is a negative aspiration, setting a defeatist attitude in the student. It's up to them to decide and learn this when they try to find a job!" Similarly, another educator felt that, "Architecture students should be taught how to get a job, not warned that they might not get one. If that is the message, then the school is failing." These views seem to reflect an inherent negativity and fear of uncertainty and suggest that schools should be more focused upon convincing students that the future of the profession holds greater certainty. Another respondent felt that teaching students to anticipate uncertainty was "too late" as they should have instead figured it out before entering school. Both of these comments acknowledge that things are uncertain, but that this uncertainty is something to be feared, avoided or to protect students against, rather than seeing it as an opportunity to speculate about alternative and potentially innovative professional futures.

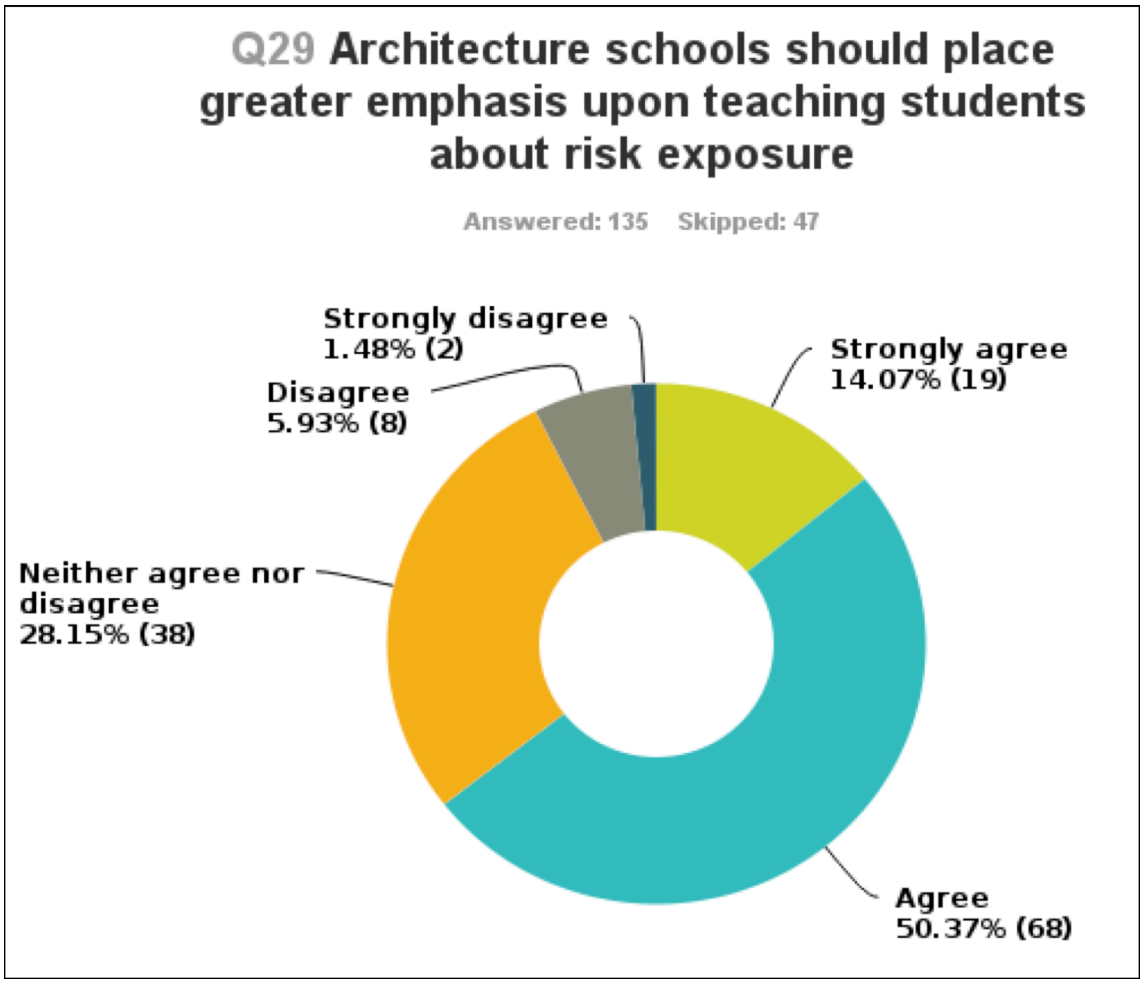

Figure 3: Harriss, H., (2015)

In response to the online questionnaires provocation that; 'Architecture schools should place greater emphasis upon teaching students about risk exposure,'15% of respondents strongly agreed, 57% agreed, whereas only 7% disagreed (with 28% neither agreeing or disagreeing), amounting to a significant amount of agreement.[22] One respondent explained that schools should ensure students are, "aware of and to comprehend risk yes... not to FEAR risk, as has happened in the past." Another respondent explained that, "Some student projects I have seen are so frivolous as to be of zero value. The schools are culpable." Others similarly supported the idea that, "Architecture schools should be about taking risks," and another argued that, "In an uncertain future, architecture schools should encourage risk-taking and innovation because it definitely won't happen in practice!" However, the argument that architectural education is and should be a rarefied place that is protected from the realities of practice, resurfaced in one respondent's comment, " It's good to be realistic and that, but they learn this at practice level. Keep the profession out of education." Complacency about the lack of this skill is a luxury that cannot be afforded for much longer without consequences for the school and perhaps most importantly, the needs of the graduate.

Learning risk management through ambiguous activities

If ambiguous circumstances are required to engender a sense of risk, how can educators set up learning assignments that facilitate students' ability to learn risk management, through exposure to ambiguous learning experiences? And how can they ensure that these outcomes involve good as opposed to bad risk-taking behaviours, resulting in good outcomes – for example innovative designs - rather than bad outcomes, such as structural collapse or personal injury? One educator suggested that a way of designing 'ambiguity' into Live Projects is to stop thinking that the solution is a 'building' but instead keep it as something much more open, and that defining

the problem might involve architectural processes, but the solution might not be 'architecture." Arguably, learning experiences that enable students to develop a sense of openness to ambiguous outputs – for example, an outcome that isn't necessarily a building design - opens up the potential for new possibilities in tomorrow's practice environment.

Risk typologies

Aside from the typical construction site risks – both physical and also structural – discussed earlier, there are other kinds of risks associated with Live Projects that relate to more intangible factors. When asked what kinds of risk taking Live Projects encourage, one educator explained that, "they help students deal with unexpected situations, to learn to adapt, to use technologies but also use local resources and to be prepared to change their designs to ensure the Live Project aims are met." Furthermore, many respondents mentioned the role of the schools to address this shortfall in risk management skills, in one case noting that, "It's not really the risk you take, but rather the lack of education on management." The suggestion here is that risk doesn't need to be taught explicitly per se, but could be integrated into established practice management curriculum. However, some respondents felt that schools were supportive of some kinds of risk taking. Apart from impacting on practice, some educators noted that a school culture that engenders innovative risk taking has benefits for the institution too, i.e. "Live Project innovation feeds teaching and research." Another educator took a more strategic view and provided a very clear description of risk-specific learning that Live Projects can offer students:

Learning risk-taking behaviours is a larger pedagogic question - you can set up a course of study to cultivate good risk taking, or the sensitivity to happy accidents and how to leverage them. The location between success and failure is feedback. Impacting people in their daily lives...there has to be a lot more risk management in Live Projects than in pure academic exercises. A 'considered' risk taker means you are able to weigh the advantages and disadvantages of potential failure, implications of failure in Live Projects are greatly magnified, so in that sense it cultivates a greater sense of responsibility and awareness of risk. The things that go wrong could be worse than getting a bad grade. We need to cultivate a greater sense of what risks there are in education in general, and how to balance them against potential good. Society in general is much more risk aware than we are in our profession - which is one of the reasons for so much conflict between architecture as a cultural enterprise and architecture as a financial or economic enterprise. We need to learn to do more risk analysis.

What this commentary also flagged up is the potentially detrimental impact upon participating communities that can occur when things go wrong in Live Projects. Given these are human lives we are talking about the penalties for failing to manage risk correctly or to make bad risk decisions can be very serious indeed.

The risk to participants in Live Projects

The US educator responses echo those of their British counterparts (and the student respondents) all discussed health and safety in relation to risk. The general consensus amongst educators is that Live Projects do present "a risk to students [sic] health and safety," - a view that is reflected in many of the students' comments. Interestingly, there were no examples of students being injured, suggesting that is a very rare occurrence. Yet, many saw this as the result of serendipity rather than strategy. Whereas the majority of the US Live Project educators operated out of University Community Design Centers – a formalised vehicle for Live Projects offering greater protections - the UK educators were often found to be running Live Projects as a bolt on to Design Studio or as an independent, optional activity. Few of the UK institutions examined offered credits to students for participating whereas in the US, the opposite applied. The evidence therefore seemed to suggest that UK educators were working with less practical support than their US counterparts, which could conflate with increased levels of risk. And yet, the US educators, whilst being more likely to operate under insurance arrangements, spoke of the higher levels of litigious activity in the US. As one educator explained, "Here in the US everybody sues everybody else. The risks are soaked up by the faculty." It was also noted that this caused a kind of insurance/liability

anxiety that also impacted on practice. Students were also sensitive to the issue of litigation, although generally seemed less anxious about it. As one student suggested, " Being on the edge is my favourite part of design. On Live Projects it's a less 'academic' risk."

Interestingly, the 'exposure' to diverse contexts different from their own has been reported as something students are seeking from their Higher Education experience. Described as "something more nebulous - the bits in between the learning," these contexts are characterised by, "face-to-face contact with diverse people." [23]

Finally, it should also be acknowledged that participating communities take risks of their own in involving unqualified architecture students into sometimes very sensitive situations. Whilst this can be remedied to some extent if the educator sets expectations effectively at the outset, there are risks for community participants working on construction sites without contractual recognition or the appropriate insurances. In addition to this, the students' awareness of the risks involved with working with real people doesn't always form a precursor to good risk-taking. One student considered the impact on community members to be the most significant risk of all. As he explained, "the biggest risks we take in Live Projects are delivering on promises - not letting the clients down."

Whilst most educators felt inclined to, 'value uncertainty,' in Live Projects, there is a spectrum of risk involved that includes both good and bad risk-taking, as well as positive and negative outcomes. Whilst it has been established that working with a community client is an exercise in risk-taking and ambiguity tolerance and offers a set of "unforeseen challenges" and unanticipated risk. The risks to the community can be strategic - in terms of leveraging learning - but also constraining, in terms of inhibiting risk-taking and resulting in pedestrian outcomes, or as one educator pointed out, "The risk is your Live Projects can contribute to and not always help the problems."

Within all the student responses, it was noted that each students' ability to locate themselves on a scale of risk revealed the extent to which they were comfortable with different degrees of risk. As one student reported, "In most cases you are left to make the decisions within a team and with a client rather than with a design tutor alone," whereas another identified that they had to, "take risks in order to make decisions."

Summary of conclusions

This enquiry identified that there is scant literature available on the value of enabling students to develop risk management and & ambiguity tolerance in relation to teaching architecture. What literature exists is largely associated with business management. Subsequently, framing the enquiry in a way that reflected architectural concerns and relevance to professional practice proved complex. However, by asking respondents about their experiences of exposure to, or experience of, risk management and ambiguity tolerance within Live Projects, the study also identified what kinds of risk was perceived to be in architecture education and practice. Consequently, the data identified emergent preoccupations that covered a broad range of risk-associated activities, from health and safety, to financial exposure.
Not only did this demonstrate the pervasiveness of risk - in other words its ability to affect many areas of architectural practice - but the general awareness of all respondents to this situation. The respondents' data highlighted the following key insights:

1. Live Projects can expose students to a wider variety of risks that closely resemble those experienced in practice.

2. Teaching and learning about risk needs to involve making distinctions between good risk, such as creative or entrepreneurial behaviours, or bad risk, such as health and safety hazards. It should enable students to gain capabilities in managing and utilising both. However, both good & bad risk should to be considered exclusively tied to a specific topic area or one model of learning. Risk might be good or bad (or any degree in between) in any area of practice/learning, depending instead on the context and likely outcomes. It should enable students to gain capabilities in managing and utilising both.

3. Students ability to locate themselves on a scale of risk, in turn allows students to recognise that

between themselves they may be comfortable with different degrees of risk.

4. Whilst the university campus does not offer a risk-free learning environment, the divergent array of risks associated with Live Projects allow students to develop what one educator described as a "whole systems overview," pertaining to effective learning of the different types of risk in practice.

5. Although Live Projects offer more proto-practical risk-taking opportunities, some Live Projects risk-taking needs to be effectively managed. Examples include those that could otherwise put students, tutors or community collaborators at risk from harm. For this reason, some risk-taking and ambiguity training exercises might be more effectively taught in a more controlled, academic environment than in a Live Project.

6. The general view is that schools should be doing more to enable students to gain at least a greater awareness of, if not a degree of experience and skill in, risk awareness and ambiguity management. That so little literature exists concerning the importance of teaching risk in schools of architecture, indicates that there is a significant research opportunity to interrogate this area further.

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