

Collaborative Cultures of Architecture Teams: Team Learning and Reflective Practice

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PHD STUDY REPORT

Collaborative Cultures of Architecture Teams: Team Learning and Reflective Practice

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OVERVIEW This project explores learning and reflection practices in architecture teams. When architects use reflection-on-action, they learn from experience. When they use reflection-in-action, they learn from experiencing. Such reflective practices help architects build project knowledge and deliver their project. But most architects work in teams, alongside individuals with different ways of learning

and knowledge perspectives. This begs the question: how does learning and reflective practices affect architecture teams? This project addresses this question by 1) using reflective practice, team learning and design collaboration literature to frame how architects learn as a team; 2) exploring how team learning influence the competitive performance of architecture teams; 3) measuring how team learning affects architecture team performance; and 4) experimenting a reflective workshop to help architects improve their team learning skills and thus, team performance. The report concludes by discussing its theoretical contributions and practical implication in their field of architecture and design.

KEYWORDS: team learning, reflective practice, design collaboration, architecture

Introduction



Architects work in teams to develop and build their designs. They work with other staff in their firm, such as the draftsman to deliver a design proposal to the client.

They also work with specialist outside their firm, such as the builder, to ensure the designs are suitable for construction. It is rare for architects to work alone, for the design and construction of architecture requires knowledge input from different experts in various disciplines. With this, it is imperative that architects know how to work collaboratively with others.

While design collaboration research is dedicated to understanding how designers collaborate, there has been little attention paid to understanding how designers learn, then design, in a team setting. Does collaboration immediately suggest that learning occurs? When designers collaborate, do they always listen, understand, and apply the contribution of others into the design? Here lies the difference between design collaboration research and design learning in collaborative setting. The former is interested in describing how a designer works with others to produce a design. The latter is interested in understanding how the designer 1) acquires the expertise of others and 2) adjust their design approach to collaborate as a team.

As Schön (1983) posits, the act of designing involves learning from experiencing (reflection-in-action) whereas the enacted design provides learning from experience (reflection-on-action). This suggest that those who did not perform or witness the act of designing will neither be able to learn from experiencing nor acquire what was learnt by the designer accurately. Secondly, every designer has their own way of approaching design (Lawson 2005), which is informed by their own way of finding out about what they are designing (Cross 1982). For an architecture team to produce a design of synergetic

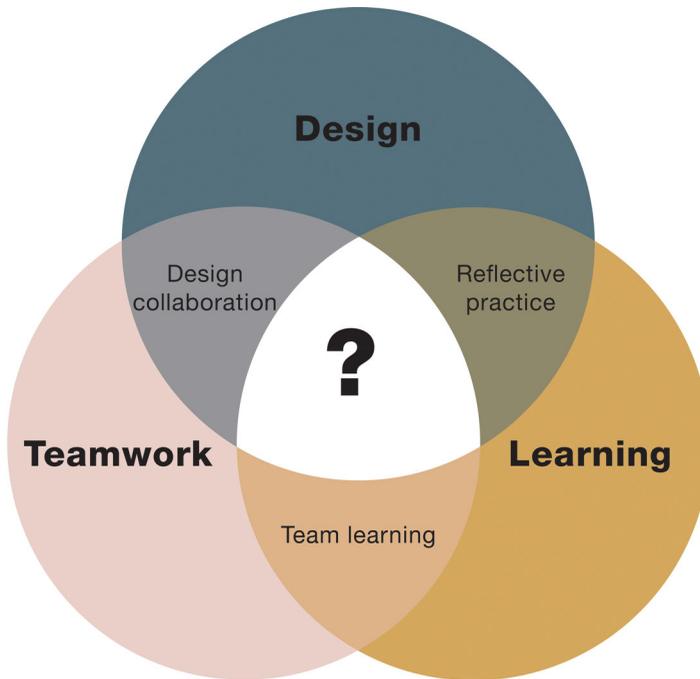


Figure 1.

Research position triangulated from existing research on reflective practice, design collaboration, and team learning.

efforts, each member needs to 1) employ learning techniques to compensate for the deficit of learning from experiencing and 2) adjust their way of finding out to assimilate into the team's approach.

This project addresses the research deficit in the following ways. The literature review describes how design is inherently linked to learning, then draws on team learning literature to describe the difference between independent learning and team learning. The case study describes how team learning impacts the performance of architecture teams in a design competition. The survey measures if team learning behaviours affected the performance of architecture teams. Finally, the intervention trials a workshop to see if reflective practice was able to improve their team learning behaviour and ultimately, their team performance.

Related literature

This research project adopts an interdisciplinary approach to identify and interrogate the research gap (refer to [Figure 1](#)).

Reflective practice

One of the earliest definitions of reflection is that it is a 'careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it

tends' (Dewey 1933, 9). This suggests that reflecting is purposeful, builds evidence to current personal knowledge and influences how the individual uses that knowledge in the future. As the design process is not simply about using described methodologies to solve a given brief, which falls under the technical rationality paradigm (Marcuse 1964), the experience of the design process also affects how the designer interprets and approaches the brief. Hence, reflecting on one's design actions and experiences is crucial in the design process.

There are two ways reflective practices occur; reflection-in-action and reflection-on-action (Schön 1983). The former occurs when the designer is designing, and unattentively learns through experiencing. The latter occurs when the designer steps back to reflect on what was designed, attentively learning from the experience. While individual reflective practices have been widely researched, there has only been a few that looked at reflective practices in design team settings (see e.g. by Dong, Kleinsmann, and Deken 2013; Kleinsmann et al. 2012; Valkenburg and Dorst 1998). Even so, these studies only looked at how individual reflections manifested in a design collaboration to advance the design task

Design collaboration

There are two common lenses used to examine design collaborations (Pikas et al. 2016), through a social lens (Bucciarelli 2003), and a communication lens (Carlile 2004). The former describes what interactions need to occur between designers and the latter describes how information is passed efficiently between designers. From these two lenses, design collaboration research predominantly focuses on the exchange of ideas and information.

But scholars have long described designing as a cognitive process; the mental action of obtaining and understanding information to enact the design (Dorst 2011; Goldschmidt and Weil 1998; Lawson 2005; Schön 1983). Since every designer has a unique way of thinking, designers need to adjust how they think about design to the team's collective way of thinking to work effectively as a team. When designers adjust successfully, they achieve shared understanding (Valkenburg 1998). Hence, shared understanding is often used to measure the effectiveness of communication techniques in teams (Johnson and O'Connor 2008).

Team learning

Team learning is the collaborative effort each member makes to build a team mental model and collective knowledge needed to accomplish the team's objective. There are three ways to examine team learning (Decuyper, Dochy, and van den Bossche 2010). As a process, where members of the team learn from, reflect on, and adapt to feedback given by themselves (Edmondson 2002). As an

outcome, the collective knowledge that evolves due to the sharing of knowledge and experience between team members (Ellis et al. 2003). Finally, as the relationship between the process and the outcome. While design collaboration research focuses on examining how design teams create shared understanding to deliver a design (social processes), team learning perspective offers an approach to examine how each designer learns to create a team mental model (cognitive processes), which then leads to the creation of consistent shared understandings.

One way to examine the effects of team learning on the performance of design teams is to measure the occurrence of team learning behaviours. Previous studies have shown that teams engaged in team learning behaviours, foster effective team interactions, which led to greater team performance (Chan, Lim, and Kuan Keasberry 2003; Kostopoulos, Spanos, and Prastacos 2013). This has been tested in education, military, and engineering context (van den Bossche et al. 2006; Cauwelier, Michel Ribiere, and Bennet 2019; Vangrieken, Dochy, and Raes 2016; Veestraeten, Kyndt, and Dochy 2014). However, there are no empirical studies regarding team learning in a design team context.

Learning, reflecting and collaborating in teams

Reflective practices help the individual understand how to frame a design situation (Schön 1983), which then informs how to conduct design activity. In design collaborations, these frames act as 'sense-making devices that establish the parameters of a problem' (Gray 1996, 576), allowing members of the team to 'see and think' like the designer and in doing so, achieve shared understanding. Hence design collaboration research has focused much on how to pass these frames efficiently and accurately from one designer to another.

But effective communication techniques only increase the likelihood of achieving shared understanding (Tan 2020). Additionally, frames are discursively constructed (Dong, Kleinsmann, and Deken 2013). This implies that team framing occurrences demonstrate how shared understanding is created of the moment. Alternatively, researchers can examine team learning behaviours of design teams to better understand how to build shared understanding.

Increasingly, architecture commissions are becoming more demanding in nature, having to meet the needs of various stakeholders. This urges architecture teams to become more diverse and to draw knowledge from different kinds of experts. Globalisation have also invited competition from international architecture firms that previously posed little threat. To survive this competitive landscape, architecture teams have begun partnering with other architecture firms to bring greater value to project-specific commissions. Hence, greater understanding on how architects reflect, learn and work as a team will shed light on how they can improve their performance.

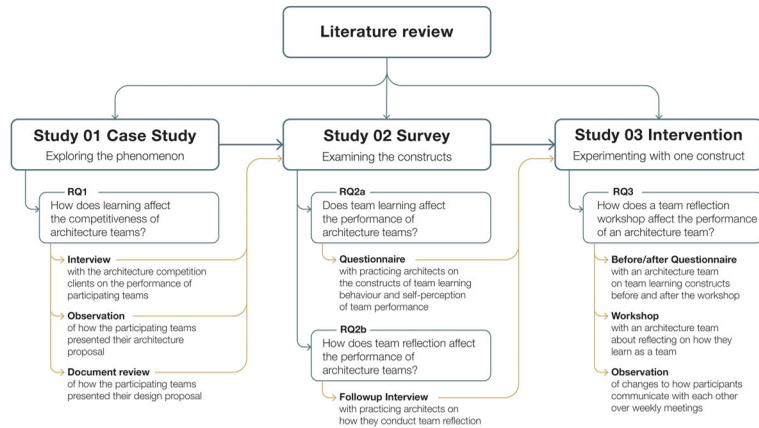


Figure 2. PhD research structure demonstrating links between research methodology, objective, questions and methods.

Research question and methodology

The overarching research question for this Ph.D. is:

How does learning and reflective practices affect the performance of architecture teams?

It is answered through the following subordinate questions:

- (1) How does learning affect the competitiveness of architecture teams?
- (2a) Does team learning affect the performance of architecture teams?
- (2b) How does team reflection affect the performance of architecture teams?
- (3) How does a team reflection workshop affect the performance of architecture teams?

These research questions are answered through three studies: an explorative case study, a descriptive survey, and an experimental intervention (refer to Figure 2).

Regarding RQ1, I conducted a case study in 2018 on a real-world architecture design competition in Melbourne, Australia. Six architecture teams were invited to participate in the competition. Each of the six teams comprised of two separate architecture firms. I 1) observed how the teams pitched their design and knowledge at the final competition presentation, 2) analysed their documents submitted to bid for the project, and 3) interviewed the jury to find out their perceptions of the participating team’s knowledge and performance in the final presentation.

Regarding RQ2, I used a validated team learning questionnaire (Savelsbergh, van der Heijden, and Poell 2009) to survey practicing architects in Melbourne, Australia. I then conducted follow-up

interviews with selected participants to find out how and to what extent they reflected as a team in the office.

Regarding RQ3, I designed and am running a team reflection workshop with a practicing architecture team. The same team learning questionnaire will be conducted prior to the workshop to establish the baseline measurements of their current team learning practice and team performance. The same team learning questionnaire will be conducted three months after, to measure if the workshop was able to improve their team learning culture and team performance.

Contributions

The findings provide researchers a team learning perspective to examine design collaboration practice. In doing so, design researchers can further substantiate the descriptive analysis of how collaboration has taken place with what team learning behaviours exhibited during the collaboration.

Specifically, the first study contributes qualitative evidence to the literature on how clients evaluate architecture teams when they pitch their designs. For practicing architects, this study provides strategies on how to present the design. The second study contributes quantitative evidence of the link between team learning behaviour and performance in the architecture profession. This study spotlights the impact of team learning on the design team performance, and the recommendations discuss how design teams can foster their team learning behaviour. The third study contributes to research and practice a pragmatic research method, the workshop, as a reflective tool to improve team performance.

Next steps

In the case study, participating teams were made up of two different firms. This meant that teams were assembled specifically for this competition and team members likely did not have experience working with each other. This research method can be replicated on a design competition where participating teams have experience working together. This will offer evidence on whether experienced teams are more likely to demonstrate team learning behaviour than inexperienced teams.

The survey was conducted with practicing architects only, to see if team learning behaviour affected their team performance. This survey can be replicated with multidisciplinary design teams, to see if different disciplinary backgrounds affected the team's ability to learn as a unit. This will offer evidence on whether contextualised knowledge affects the team's ability to learn as a unit.

The intervention workshop was tested with a team of architects to observe changes in team performance. This workshop can be tested

with students working in groups to see if it improves their team performance.

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Disclosure statement

The author declares no conflict of interest.

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Biography

Linus Tan is a PhD Candidate at Swinburne University of Technology. He researches on team-oriented strategies to improve design collaboration efficiency. Pillared by Reflective Practice theory and Team Learning Behaviour theory, his broader research is on understanding how team learning strategies leverage architect's tacit knowledge to win projects.

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