

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/308380389>

Designing Project Management

Conference Paper · May 2016

CITATIONS

0

READS

604

3 authors:



John L. Heintz

Delft University of Technology

31 PUBLICATIONS 64 CITATIONS

[SEE PROFILE](#)



Louis Lousberg

Delft University of Technology

20 PUBLICATIONS 40 CITATIONS

[SEE PROFILE](#)



Hans Wamelink

Delft University of Technology

106 PUBLICATIONS 399 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Futura; Future Value Chains of Architectural Services [View project](#)



Organisation of the ERES 2017 conference in Delft [View project](#)

Designing Project Management

Dr. John Heintz, Dr. Louis Lousberg*, Prof. Hans Wamelink**

**Delft University of Technology, Department of Management in the Built Environment*

Abstract

In this paper we introduce the concept of Designing Project Management. On the basis of our earlier work, we suggest that there is still a gap between what is known from recent project management literature and what project managers can structurally help in the effectiveness of their work. Assuming that project management is a form of solving wicked problems, we propose a designerly way to solve these problems. To this end, we introduce the Project Design Cycle, consisting of the elements Awareness, Design, Performance and Reflection. This cycle has been studied in a purely exploratory study. Result of the study is that these elements are sometimes recognized, sometimes not, that the order of these elements has been hardly recognized, that the difference between Reflection-in-action and Reflection-after-Action has been recognized and a distinction seems to occur between a 'large' Project Design Cycle through the overall project management and a 'small' Project Design Cycle in the daily management. We finally conclude that more training in the cycle is necessary because this will possibly lead to a more effective project management.

Keywords: project management theory, managing, designing, project management education

1. Introduction

In this paper we introduce the concept of Designing Project Management as a domain specific approach to the management of architectural design and construction projects in an ever changing environment. Much recent research points to the importance of understanding projects, and building projects in particular (Svejvig, 2015), as social systems in which there is a complex interplay and alignment of different goals, meanings, and perspectives (O'leary, 2013). This research suggests that it is important to take the personal, professional and business situations of project partners, commissioners and stakeholders into account when attempting to manage project teams [citation]. Many of the leaders in the rethinking project management (Cicmil, 2006; Hodgson, 2006; Morris, 2013) have come to the conclusion that as yet little of this research has led to significant advances in project management tools, practice, or education. Nor does the so-called classical approach address issues of daily practice or career development of project managers structurally do. In this we believe that current approaches to project management, while containing much essential material are not entirely adequate to the task of helping project managers to carry out their work (Heintz, 2015).

Our purpose is to refocus education from learning the systems of project management to learning how to be a project manager. To do this we propose an approach to project

management that is based on the agency of the project manager rather than on the integrity of project management systems. It is not that we believe that the project management systems are irrelevant, but that we place the emphasis on the project manager's agency in selecting tools and actions from those systems and enacting courses of action using them. More specifically, we choose to see project management as a process of designing and enacting courses of action and "preferred situations". In doing so we are shifting attention from project management as an idea to project management "an ostensive (the idea) ... [to] a performative (the enactment of the idea) dimension" (Carlgren, 2016).

We call this approach Designing Project Management. The research intention is as much to provide a lens through which to view project management action as to confirm the use of designerly approaches to problem solving by project managers. The educational intention is to offer a model for and an approach to training students in management of design and construction projects in how to enact the systems and theory of project management in the management of complex building projects. Further we believe that this approach will support young project managers in developing their professional capabilities.

This paper discusses the results of a preliminary explorative research project attempting to determine if the elements of the project design cycle can be recognised in the practice of project managers, and to what extent these elements function together as a cycle. The data consists of an interview based case study, and four semi-structured interviews of project managers. We found that the elements were observable, and that while not structured as a formal cycle, a regularity and interdependency between the elements could be observed.

2. Designing project management

2.1 Design in project management

By focussing on the action of the individual project manager we shift the interest from the validity and robustness of project management systems, many of which are aimed at monitoring and enforcement, to the interventions project managers make in steering projects towards successful completion. Such interventions occur at a range of scales from major problems such as development of project organizations to 'smaller' daily problems such as conflicts between project team members. Seen this way, project management is a form of problem solving (Ahern, 2014). These problems may be planning problems, or they may be problems requiring interventions in already ongoing events. Anticipating the current interest in design thinking Herbert Simon connected problem solving in areas such as management with design in areas such as architecture (Simon, 1969) He proposed that design was a approach to general problem solving across a wide range of fields, and defined design as itself "defin[ing] courses of action aimed at changing existing situations into preferred ones." (Simon, 1969) A more recent and more specific definition is: "A design can be defined as a model of an entity-to-be-realized, as an instruction for the next step in the creation process." (Aken, 2007). Indeed project management can be seen as a process of situated inquiry in which the project manager must

interrogate the situation he or she finds themselves in, and through processes of sense-making arrive at judgements about, or design, what to do. (Lalonde, 2012)

The recent interest in the application of design thinking to management (Boland, 2004; Martin, 2009; Brown, 2008) has been based on the belief that because of its “liquid and open character” (Boland, 2004), design is an excellent way to approach the more general types of problems encountered in management. Although much of the literature on design thinking in management has drifted away from the earlier work on what Carlgren et al (2016) call designerly thinking, we believe that the distinction will be more limiting than empowering of research and practice in this area.

We therefore draw our inspiration from both the contemporary work on Design Thinking, and the older work on how designers think (Dorst, 1997; Cross, 2006; Lawson, 1997).

Design problems facing design and construction project managers include developing briefs and budgets, composing the design teams, specifying tendering approach and project organization, and creating construction schedules. However, design is also required in order to solve the day-to-day problems that face building project managers. Determining how cope with conflicts between stakeholders or actors, deciding how to bring a jury’s deliberations to a close and choose the architect. In each case the project manager must inform him or herself about the current situation, and determine a course of action that is very likely to lead to the desired result. Both kinds of design problems, the mapping out of the future course of the project, and the resolution of day-to-day problems occur under a high level of uncertainty, and in dynamic situations where hidden and exogenous factors will likely play a significant role in driving the project off the current plan. Design thinking is required to find courses of action that will yield the desired results but will be robust across a large range of possible futures.

2.2 The Project Design Cycle

Design whether in the more generalized sense described by Simon, or in the more specific architectural sense, is a cyclical process. In the simplest sense this is a cycle of generate and test (Simon, 1969), but the design cycle also bears similarity to Deming’s Plan-Do-Check-Act cycle (Deming, 1952) and the Kolb Learning Cycle: Concrete Experience – Reflective Observation – Abstract Conceptualization – Active Experimentation (Kolb, 2000). These similarities are not coincidental, design and management both rely on learning and feedback from the situation to arrive at better outcomes than might otherwise be realized. For the purposes of illuminating the role of design in building project management the following formulation of the cycle may be most helpful:

Awareness – Design – Performance – Reflection

2.2.1 Awareness

The cycle begins with establishing awareness of the current situation. This awareness encompasses not only the formal project as captured in so called “project information”, but also, and importantly, the social situation (situational awareness), including the status and state of the various actors and stakeholders in the project. Awareness of what is going on, who is doing what, etc. Also of intentions, goals, and plans. Awareness also encompasses the determination that ‘something needs to be done’ i.e. deviation from the intended course of the project in some way. Awareness has a very significant component of sense-making.

2.2.2 Design

Out of awareness flows an understanding of both the current state, a need for change and perhaps a desired outcome. Having determined that action is required, design refers to the shaping of a course of action. Design thinking here is important in its open and free approach to generating alternatives and possibilities. But Design should include both generate and test. A designed course of action is also one that has been in some sense tested.

2.2.3 Performance

The designed course of action must be performed by the project manager. The choice of the word performance refers to the performative aspect of management. It is not just a matter of carrying out the design. A performance is required in that project management requires that one changes people’s minds and actions. This requires that one reach them in the same way an actor does. Here we define performance as acting/ putting on a mask to change behaviour.

2.2.4 Reflection

Finally, there is a reflection upon the outcome, attempting to draw any lessons about the designed course of action or its performance that may be useful in the future. We use Reflection in two different senses. In the first sense reflection refers to reflecting in a separate moment after the performance is completed, reflection-after-action. This type of reflection is used by e.g. Deming’s (quality) management cycle and Kolb’s Experiential Learning cycle (Kolb, 2000). The second sense in which we use reflection is reflection while performing, referring to reflection-in-action, introduced by Schön and defined as thinking about doing something while doing it (Schön, 1983). It is precisely these two approaches of reflection-after-action like Deming and Kolb and reflection-in-action as described by Schön that seem to come forward in the next case.

3. Case: the Vondelpark Pavilion in Amsterdam

3.1 Introducing the case and methodology

The Vondelpark Pavilion is at a magnificent location in the Vondelpark in Amsterdam. Previously, the Pavilion housed a Film Museum, and a café (always packed in the summer), giving the location the reputation of ‘a cultural media house’, a platform where the creators of art and culture programmes could find a varied audience. The departure of the Film Museum meant that new tenants had to be found – and a second media organization agreed to lease the building. A new restaurant tenant was also found at this time. Due to the change in tenancy and a substantial backlog of maintenance issues, the building had to be substantially rebuilt. The new lease agreements left a very limited time for the renovation. The project management was in the hands of the Project Management Office of the municipality of Amsterdam and consisted of a project manager, assisted by an assistant and a quantity surveyor.

To explore to what extent the Project Design Cycle described above could be recognized in the daily practice of a project manager, a pilot interview covering the Vondelpark Pavilion project was held with the project manager. The data were analysed on four topics: 1. the identification of the elements of the Project Design Cycle, namely Awareness, Design, Performance and Reflection, 2. the sequencing of the elements of the cycle, 3. the difference between Reflection-after-action and Reflection-in-action and 4. the identification of large and small scale cycles during the project. The interviewee was already aware of our work, and for this reason a document was provided ahead of the interview clarifying our then current understanding of the project design cycle. The interview was conducted in Dutch, and translated by the authors.

3.2 Data and Findings

When asked if he could recognize the elements of the PDS in his work for the Vondelpark pavilion, he replied: ‘the funny thing about the [PDS] model is that in the last few years with the complex projects I have managed, you start with setting up the project on a rather systemic way – I mean: the money should be okay, planning, organization etc. etc. – then you go along, and things prove to be quite different than you expected. This is not about, for example, whether the schedule is right, but it is about the peoples’ perception, what their roles are, and whether they feel good about the objectives; because if [they do] not, they will object or start acting in complicated ways. In the latter case people just don’t go along with you, do not act as agreed upon and then you must analyse, you must repair, you must change.’

In the Vondelpark project, at a certain moment different actors had different perceptions of the importance of keeping to the schedule. The schedule was accepted as such, but without sufficient commitment. It was only during the course of the project that the project manager became aware of this problem. Once he became aware of this issue, the project manager attempted several different approaches to getting the team to accept and implement the schedule. Including a ‘hard line’ strategy developed in consultation with the project manager’s employer. All without success. Finally, the project manager determined to approach the issue by

trying to understand what the schedule meant to the other actors, he spent two months in conversations between the various actors: *“my question remained; how do I get my team really involved in the plan? For a few months, at the start of a construction meeting, I began to ask every time: how are you? We were able to talk about our concerns, the opportunities we saw and the threats, about how the project was accepted in their organization. Further, a study of sense making¹ in the project seemed to start to bear fruit. People came as reborn out of the conversations that were held in the context of that research. In these conversations they had it made clear for themselves and others what this project was about. Hence they behaved differently during the regular project meetings and the schedule was actually no longer an issue.”*

Reflective discussions by the group members during the regular meetings were uncomfortable, but there definitely was reflection during the ‘sense making’ conversations.

The episode outlined above displays the elements of the Project Design Cycle, but not in a clear sequence. There were Conscious moments of trying to make sense of the situation and then designing a course of action to remedy it. Also smaller cycles imbedded in a large cycle. Trial and error, but with intention. We see the project manager actively expanding his awareness, designing a strategy, trying, and then starting again. There was a ‘large’ Project Design Cycle from the fuzzy beginning, to the eventual implementation and confirmation of the overall schedule. But there were also ‘small’ daily cycles in, for example, meetings, in which following daily ‘surprises’ actions are planned, undertaken and given feedback to support the 'large' cycle.

The project manager had the awareness in advance that things could go wrong due to lack of clarity regarding the contract and designed an arrangement on this issue. In the everyday project management however, it seemed different: *“during the construction process, you're more reactive as manager, sometimes the phone rings and you have to solve a problem. However, you notice that there is not only a construction problem, but also from the angry call from the contractor that the structural engineer is not cooperating. And then when I check with the structural engineer it appears that he does not do so because he did not receive an order to do additional work. But, that's pretty standard, I have subsequently called the managing director of the structural engineer to have a coffee and asked him: why do you react so unprofessionally?”*

In this episode, the project manager saw *“no design here: it is a matter of just keep asking questions. Especially during the construction phase you can be direct, because there are simply agreements and everyone should keep them, so you can just say to someone: you're not doing your job, why is that? It does not really require social skills, it's just being direct and directive. But sometimes you also have to be diplomatic, as in: how do we fix this?”* There appears to be a conscious dealing with problems on the one hand, but otherwise a fairly routine resolution is shown in which, at least not consciously, is designed and performed. It is, one might say, classical project management. Though there seems to be consciously reflecting-in-action.

¹ This was a research project conducted by the second author, Louis Lousberg (Lousberg & Pikker, 2015)

This was completely different regarding a large ‘surprise’ in the project. *“The surprise with the hotel and catering industry entrepreneur was an exciting one. We had designed a kitchen with a catering consultant and tendered a hotel and catering entrepreneur as a tenant of the restaurant. After which this entrepreneur said: I can’t work in that kitchen. His design for the kitchen which cost not only a 100.000 euro’s more but also had all sorts of consequences for the rest of the construction work. I initially approached this in a hard way: ‘you pay it all by yourself, because you had to say this in the tender procedure’ but finally we settled it on each a half of that amount.”*

In this episode the project manager described his role as: *“first analysing what happens when we would accept this, what impact will this have not only on the building, but also on the costs on the basis of current contracts with e.g. the architect or the consequence for the penalty clause with the contractor at time overrun, in that sense it was complex. I eventually had to talk to the clients. Client B agreed because of the entrepreneurship and employment of this hotel and catering entrepreneur. But before that he summoned them to appear and informed them that this was the last time, otherwise he could leave. Client B picked this up beautifully: the entrepreneur sat shivering on his chair, because first the client made clear that this was the very last time and only finally he presented the deal.”* That was a moment of performance as we have defined in this paper.

Finally, we asked for moments of reflection e.g. at the end of the day. The project manager: *“I have a lot of those moments, especially when things have clashed. Then I ask myself: was this smart or tactical enough by me? I also discuss this often with my colleagues, of which the most important result is that you become aware of things and try out your thoughts. By talking about it, it becomes a kind of reality.”* With the observation that this turns out to be about Reflection-after-action the interview is closed.

4. Interviews with project managers

4.1 Introduction

After reviewing the pilot interview/case, semi-structured interviews were carried out with four project managers. For these interviews we did not explain the Project Management Design Cycle in advance. Nor were these interviews restricted to a single project. At the beginning of an interview we explained that the research was concerned with establishing what project managers actually do, that we had created a model on the basis of what is known in the literature and that we are now investigating whether the model is adequate. Also, we distinguish between strategic and daily management and that the model might be applicable to both. Interviewees were asked to tell us what they did. Questions followed where necessary to encourage the interviewee to address aspects of the PDS, but without using any of the terminology of the model. Extensive notes were taken from the recordings of the interviews, and the analysis based on these notes.

4.2 The four elements of the cycle

Our opening question at all four project managers was: "what do you do as a project manager?". One of them replied, *"I start with identifying ... the program of requirements [including] the environmental factors i.e. stake-holders who can influence the project, feasibility studies, risk analysis, ... and then I walk through all management elements. ... [then] I start with a Plan of action."* Another project manager described his role as *"determining frames ... My role in this is: making it a project. ... I look at it from the point of view of project hygiene. My role is very much to agree, capture and make people stuck to their role. ... I'm not going to start with a project if I don't have written my own project plan. You need to formulate your own assignment as it were. This includes explicit creation of what I do not. ... First you focus the project on what do you want to achieve, then you need to set it up and then you go do."* Just like the project manager of the Vondelpark case, both project managers start with gaining awareness of the project and environment, and then create a Plan of action or determine and establish the frameworks within which the project can be carried out; the first steps in a large project design cycle.

Further, one of the project managers describes how she treats a 'surprise' in the daily work: *"I try to advise the client as well as possible, because in the end it is not my risk, but that of the client. I draw up scenarios, and the client then asks me ' what do you think? '. First, there is a problem signalled, that problem is extensively unravelled on what risks we actually have and there are possible measures (Design), where each choice has all kinds of consequences, up to and including the procurement strategy. So you will have to think about very well."* And another says about 'surprises': *"I manage decision making, by my client, but also by myself. However, if something happens, I always ask myself: 'is this bad, is it an issue? ', because what everyone does when something is an issue – especially in a meeting with techies – is to solve, without thinking at all whether it is necessary. I sharpen the problem in terms of consequences, I see that as my role compared to other team members."* To which another project manager adds: *"Actions such as letting clients choose where the paintings may hang – together with the architect – are deliberately designed [to create support for the project]."*

When asked to elaborate on acting out his role as project manager, one interviewee responded: *"I have been trained to think of yourself as a tool. That is, to be aware of what you can do and what you can't, also of how you look, what you're wearing, for example, a suit and sometimes a tie. The rule is that you never are underdressed. "* Another: *"Yes. I act absolutely. For instance, in a meeting where I enter and think about the place where I sit down, and meetings where I say nothing or only two things. What I'm going to do, mainly depends on the others."* And another: *"Sometimes you need some sort of decisiveness. This has to be called a form of bluff sometimes, because you still do not know exactly what's going on."*

Regarding Reflection one interviewee said: *"I think about work when I'm in bed at night. It's about responsibility. Whether did you do things well as a team, or did you have enough control ..., did we do things well – you always doubt of course – did we make the right choice, could we have done it not better in another way?"* All four project managers said they think it's important

to reflect with colleagues: *"Often this is in conversations with colleagues who were there. We discuss how it went, what the next steps are that we need to take, what those are in six weeks. ... It is sharing what you are going through, that mutual collegiality, that reflection is very important to be able to grow. That you should do as much as possible." Or: "Moments of reflection are those in which I am away with my assistant on to or off from a meeting. We also here internally with colleagues do very much to exchange knowledge, both structurally at meetings every month as it happens to come across or look for each other, with us is that essential."*

In the interviews all four elements of the Project Design Cycle can be recognized both in large design cycles and in 'surprises' in everyday work. As in the Vondelpark case that they are not always seen by the interviewees to constitute a formal or explicit cycle.

4.3 Content and Support

In addition to the recognition of the PM Design Cycle, the analysis of the data from the four interviews resulted in two additional findings.

1. There seems to be an awareness of two distinct issues: content and support. All project managers report that they have a strategy or plan of action which they enact and against which they measure progress. This was often referred to as [project management] content. In addition to this, three of the interviewees emphasized their work on generating support or enthusiasm (*draagvlak*) for the project: "For one of our projects we let the Board take a decision on our proposals for their wing. We have lots of support, since we have put a lot of time in it in recent months. So that decision will certainly succeed", as with the user "Our added value is the creation of support [for the project]. By making people feel that they are heard, making them feel that something is done with the comments they make, even if you do nothing with it, explain why you do nothing, give feedback and as much as possible make them understand that it is going to work." For example let the architect have a say in the selection of technical advisers to have a good click because otherwise everyone sits on his small island" or "to make sure that everyone is heard, for example, despite differences in dominance in terms of personality. And I'm steering in the sense that I always say ' what are *we* going to do now, how will *we* approach this? (-) It is really people work, I'm aware of this increasingly." The latter is typical, there seems to be a dual consciousness in the way project managers look at their work. This dual consciousness seems to consist of content and support. Based on that Plans of approach are made (content) and captured (support) and meetings are led. "A junior project manager has in a great deal of difficulty in following the rhythm of a meeting. A senior project manager actually looks at what happens in a meeting, by which I mean how people respond, whether they are involved, or what they say, or not. A junior project manager has no time to think about how he should steer a meeting. ... If it's in a meeting about an ICT-issue and the ICT-man says nothing, then you should think: 'That is not ok'. The way someone says something, or doesn't say, is almost more important than what he or she says. "

2. *That dual awareness has to do with the professional growth as a project manager.* In the previous paragraph, a relation was established between the project managers focus on generation of support and the development of a project manager in his or her career. All four interviewees supported this relation. For example: "there comes a time in your career that you come out of the shadow of an experienced project manager into full exposure. ... It is important that you gradually develop your soft skills more and more, that you observe how people are most effective." And: "you can be promoted from assistant manager to senior manager if you can look further than just facilitating, if you have an eye for the interests at stake. If you have a kind of independence, and are aware of the risks out there It also has to do with your attitude, you shouldn't be an uncertain little mouse." And again: "Self-reflection and feedback (Reflection) of your surroundings is an important part in order to grow. If you always make others responsible, you can't grow. ... You have to dare to experiment with management styles to see what work, therefore you need self-reflection." Beside that dual awareness has to do with professional growth, the last quoted project manager seems to indicate that even in that there is a cycle.

4.4 Education

The interviewees were explicitly asked which characteristics or capabilities distinguished a senior project manager (capable of leading projects independently) from a junior project manager (capable only to assist a senior project manager). In addition to the dual awareness described in the previous section, they consistently identified two things that were key in this distinction 1) the ability to conceive of and enact courses of action independently, 2) the ability to lead or carry a team – to perform with authority. Thus, while the knowledge of project management systems is an important pre-requisite to working as a project manager, it seems to be that it is precisely those capabilities highlighted in the Project Design Cycle which are key to career development and success as a fully fledged project manager. Indeed, many of the interviewees indicated that as a senior project manager they no longer concerned themselves with monitoring daily progress or operating project management systems.

This points to the importance of preparing young project managers not only for their immediate employment as junior project managers, but also to be able to successfully grow into more senior roles. To do this, we believe that project management education should address issues of design, performance and reflection as integral to project management. We do not necessarily think that project managers trained through the use of the PDS will always follow these steps in practice, rather that by incorporating the PDS into their practice, they will approach the issues of awareness, design, performance, and reflection in a more considered and professional manner.

5. Discussion

. What we have tried, is . his has been done by investigating case and four comparable interviews with project managers

The interviews have yielded evidence of all four elements of the Project Design Cycle. However, the complete cycle itself was not observed. Rather groups of elements were reported

together, and in the order described in the model, but not the whole cycle. These fragmentary cycles occurred at both large scales and smaller day-to-day scales. There is too little data to show more than the possibility of recognizing these elements and the possibility of consistent relationships between them. Further research will be needed to both firmly establish the ubiquity of the Project Design Cycle elements, their cyclic relationship, and the degree to which project managers use these elements as an explicit method. However, we might speculate that the Project Design Cycle will not be observable 'in the wild' as an explicit method. Rather we believe that further research will show that the Project Design Cycle is a formalization of habits of thought and action common among experienced project managers.

Both the literature upon which the Project Design Cycle was based, and the interview results here have suggested that the Project Design Cycle and the behaviour it attempts to capture and (eventually) reinforce are strongly related to a number of important areas of management research – sense-making, methodological pluralism, design thinking and leadership. Further research will be needed, both in the literature and in the field, to explore how each of these processes manifest themselves in the behaviour of project managers and in the Project Design Cycle.

6. Conclusions

In this paper a first exploratory research is conducted the recognition of the Project Design Cycle in managing . literaturethe Project Design Cycle consists of Design, Performance and Reflection. Subsequently, in an interview with the manager of a complex project followed by comparable interviews with four different project managers we looked for moments in the management of the project to which one or more elements of the cycle may be attributed. The research reveals that: 1) the elements sometimes are and sometimes are not recognized. 2) The sequencing of the elements is barely recognizable. 3) In some moments there is reflection-in-action and sometimes reflection-after-action. 4) In everyday work sometimes management can be described as elements of a 'small' Project Design Cycle and sometimes as elements of a 'large' Project Design Cycle. 5) There seems to be a dual awareness: content and support and 6 That dual awareness has to do with the professional growth as a project manager. Follow-up research will reveal to what extent this can be confirmed and deepened.

References

Ahern T, Leavy B and Byrne P J (2014) “Complex project management as complex problem solving: A distributed knowledge management perspective.” *International Journal of Project Management* **32**(8), 1371-1381.

Aken J E v, Berends H and Bij H v d (2007) *Problem-solving in organizations: a methodological handbook for business students*, Cambridge, Cambridge University Press.

Boland R J and Collopy F (2004) *Managing as Designing*. Palo Alto: Stanford University Press.

Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), 84.

Carlgren L, Rauth I and Elmquist M (2016) "Framing Design Thinking: The Concept in Idea and Enactment." *Creativity and Innovation Management*, 25(1), 38-57.

Cicmil S, Williams T, Thomas J, and Hodgson D (2006) "Rethinking Project Management: Researching the actuality of projects." *International Journal of Project Management*, 24(8), 675-686.

Cross N (2006) *Designerly ways of knowing*, London, Springer.

Deming W E and Renmei N K G (1952) *Elementary principles of the statistical control of quality: a series of lectures*, Nippon Kagaku Gijutsu Remmei.

Dorst K (1997) *Describing Design, A comparison of paradigms*. (PhD), Delft University of Technology, Delft.

Heintz J L, Lousberg L H M J and Prins M (2015) *Re-Designing Project Management: Steps towards a project management curriculum for a sustainable built environment. Proceedings of CIB International Conference Going North for Sustainability: Leveraging knowledge and innovation for sustainable construction and development*, 23-25 Nov 2015, London.

Hodgson D E and Cicmil S (2006) *Making projects critical*, Basingstoke, Palgrave Macmillan.

Kolb D A, Boyatzis R E and Mainemelis C (2000) "Experiential Learning Theory: Previous research and new directions." In Sternberg R J and Zhang L F (Eds.), *Perspectives on cognitive, learning, and thinking styles*, NJ, Lawrence Erlbaum.

Lalonde P-L, Bourgault M and Findeli A (2012) "An empirical investigation of the project situation: PM practice as an inquiry process." *International Journal of Project Management*, 30(4), 418-431.

Lawson, B (1997) *How designers think: the design process demystified* (3rd ed.), Oxford, Architectural Press.

Lousberg L H and Pikker G (2015) "Sensemaking in the park-keeping the story alive." *Procedia-Social and Behavioral Sciences* 194: 96-104.

Martin R L (2009) *The design of business: why design thinking is the next competitive advantage*, Harvard Business Press.

Morris P W (2013) *Reconstructing project management*, Chichester, John Wiley & Sons.

O'leary T and Williams T (2013) "Managing the Social Trajectory: A Practice Perspective on Project Management." *IEEE Transactions on Engineering Management*, **60**(3), 566-580.

Schön D A (1983) *The reflective practitioner: how professionals think in action*, New York, Basic Books.

Simon H A (1969) *The sciences of the artificial*, Cambridge, MA, MIT Press.

Svejvig P and Andersen P (2015) "Rethinking project management: A structured literature review with a critical look at the brave new world." *International Journal of Project Management* **33**(2), 278–290.